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Courtesy Nat'l Fire Protection Ass'n

"A little fire is quickly trodden out,
Which, being suffer'd, rivers cannot quench."
—Shakespeare, King Henry VI.

FIRE INSURANCE INSPECTION AND UNDERWRITING

An Encyclopedic Handbook Defining Insurance Terms and Describing Processes and Materials Used in Mercantile and Manufacturing Establishments, and Their Fire Hazards

By

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and

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Members National Fire Protection Association
Insurance Society of New York

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PREFACE

In considerably less than a year's time, the first edition of Fire Insurance Inspection and Underwriting has been entirely exhausted. This is a remarkable record considering that the book was published during "war times," when a great number of our male population were away from their regular vocations. Immediately upon its publication, insurance companies, and in fact insurance men generally recognized the book's material worth, and this is evidenced by the receipt of many complimentary letters and favorable press comments.

While the major portion of the data is similar to the first edition, we have sought to bring the subject matter strictly up-to-date by eliminations, substitutions and additions. Practical field men, insurance engineers and others have been freely consulted, with the result that we now feel that about every special hazard of importance has been included. The new features are the elaboration of chemical terms, explanations of the fire policy, special forms of insurance such as Use and Occupancy, Profits, Rents, Improvements, Leasehold, Legal Liability and others, and many new illustrations.

As in our first edition, we have endeavored to describe matters in a brief, concise and plain manner so that the volume may serve as a text book for the inexperienced, and as a reference book for the experienced. Our primary object, however, is to help the "beginner," who usually has to wait for the "golden opportunity" before his advancement really begins.

We believe that the book is regarded as a standard work and therefore feel a responsibility in keeping the data contained therein as correct as constantly changing conditions will permit.

While strictly a fire insurance work, this book is intended

also for use of members of fire departments, fire prevention bureaus, warehousemen, fire marshals, factory engineers and others employed in the conservation of life and property.

The authors are glad to avail themselves of this opportunity to express their grateful acknowledgment to Messrs. F. S. Little, Sinclair T. Skirrow, Charles E. Jahne, Thomas O. Gildersleeve, William A. Richey, M.A., John L. Seeber, Horace G. Boyle and Walter Bladen for their able and kind assistance.

We welcome suggestions so that changes may be made in a future edition.

C. C. D.
W. O. L.

Authors' Note—Many of the specifications and rules quoted in the book refer to New York City practice, and this being set at a very high standard we feel that little trouble will be experienced if they are followed throughout the country.

ILLUSTRATIONS

FIRE INSURANCE INSPECTION AND UNDERWRITING

A

A.—Abbreviation for ampere.

ABACA is Manila hemp.

ABANDONMENT CLAUSE—The standard policy states that there shall be no abandonment, i. e., instead of the property owner turning over what is left in the way of salvage to the company and demanding a full payment of the policy, he is obliged to take care of all damaged property and protect it from further damage to the best of his ability until an adjustment of the loss has been made.

ABATTOIR OR SLAUGHTERING-HOUSE—Usually a nuisance to neighborhood unless located in outlying district. The majority are large area, frame. Note if coal stove heat in office or lounging room; refrigerating; casing making. The cattle pens often open directly into the rear of the building. These are usually littered with straw, and being constructed of wood, burn fiercely.

ABIETINE—Sort of resin derived from turpentine.

ABOVE GRADE—Policies covering stores and dwellings do not permit business occupancy above grade floor unless under a special permit and for which a charge is made. Such occupancies as a dentist, or doctor with office in dwelling section or dressmaker, with but a few hands living on premises and without stock or show room, are not considered businesses under this rule. The nearest floor to the street floor *is considered grade* floor and is usually determined by *counting the number* of steps to each floor.

ABRASIVE CUTTING is performed by means of stones, sand, emery dust, glass, carborundum and in some cases by soft, friable iron alone.

ABSORPTION SYSTEMS—See Refrigeration.

A. C.—Abbreviation for alternating current.

ACADEMIES OR COLLEGES—Usually of very large area with unprotected floor openings including well holes, the individual rooms enclosed in lath and plaster partitions with sash doors. Common hazards are those of schools, i. e., heating, lighting, laundries, manual-training class rooms, kitchens, pranks of students, repair shops. The moral hazard is that of private ownership, unprofitableness from poor selection of location, inaccessibility, lack of transit facilities. (See Schools.)

ACCELERATOR—See Dry Valve Accelerator (Grinnell).

ACCESSIBILITY—In reporting out-of-town risks, it is necessary to state whether the property can be easily reached by fire department and the distance to nearest company, the distance to nearest fire hydrant and alarm box, the condition of roads, whether dirt, stone or other pavements, grade of road, average hydrant pressure, open bridges or other handicaps which bear on the chances of salvage. Note if fire hose must be strung across railroad tracks from nearest hydrant. If such be the case, a passing train might cut the hose. See Protected Risks; see Remote Risks.

ACCOMMODATION LINE—A line of insurance taken by a company on a poor risk to accommodate a broker whose volume of business warrants the acceptance of an occasional undesirable risk. This practice has been very much abused. Brokers who have no prestige and very little "good" business, are at times hard pressed or unable to properly cover risks whose insurance they have solicited, and therefore "peddle" the business out to large brokers on a percentage basis. See Underwriting.

ACCOUNTS—Cannot be insured under the standard policy form. See Uninsurable Property.

ACCRUED CHARGES—This insurance is to recompense the warehouseman for charges which have accrued on goods left in his charge.

ACENAPHENE—A coal tar product.

ACETATE—A salt formed by the union of acetic acid with a base. No fire hazard.

ACETATE OF ALUMINA—Used as a mordant by the dyer and calico printer.

ACETATE OF ETHYL—Is a clear, colorless, volatile liquid of fragrant odor. Used in medicine and for flavoring. Very inflammable. Flash point about 40 degrees F. Boils at 167 degrees F.

ACETATE OF LIME is lime, acetic acid and a kind of tar.

ACETATE OF LEAD OR SUGAR OF LEAD is prepared by dissolving litharge in an excess of acetic acid, when the solution deposits prismatic crystals of the acetate which are easily dissolved by water and alcohol. Poisonous. No fire hazard.

ACETATE OF METHYL—Is a clear, colorless liquid. Highly inflammable. Flash point about 35 degrees F.

ACETATE OF SODA—Sulphate of soda and acetate of lime. No fire hazard.

ACETENE—Highly combustible gas.

ACETIC ACID—A colorless, poisonous, corrosive liquid obtained from the dry distillation of wood or from the oxidation of alcohol. Used in the manufacture of dye stuffs, coal tar products and various manufacturing processes. Not inflammable. At its boiling point, 244 degrees F., its vapors are inflammable.

ACETIC ALDEHYDE—An inflammable, volatile liquid.

ACETIC ETHYL—Same as acetate of ethyl.

ACETONE—A colorless liquid consisting of 3 parts carbon, 3 parts hydrogen, 1 part oxygen. Obtained by dry distillation of wood, and by the destructive distillation of acetate of lime. Used as solvent for nitro-cellulose in production of lacquer, and celluloid cement. Highly inflammable. Flash point about 35 degrees F. Boils at 132 degrees F. See Volatile Solvents.

ACETONIC ACID is formic acid and acetone.

ACETYL CELLULOSE—Made from cellulose and acetic

anhydride. Analogous to nitro-cellulose. Used same as celluloid. Not inflammable.

ACETYLENE—A form of illuminating gas formed by the action of calcium carbide and water, in which action the lime leaves the carbon with the production of considerable heat and becomes slaked lime, while the carbon unites with the hydrogen and becomes acetylene. Contains 12 times as much carbon as hydrogen. Inflammable. See Calcium Carbide.

ACETYLENE GAS GENERATORS—Should be located outside of insured buildings and not within five feet of any opening thereto, nor should they be opened toward any adjacent building, and must be kept under lock and key. The dimensions of the generator house to be no greater than the apparatus requires to allow convenient room for recharging and inspection of parts. The house to be thoroughly ventilated and any artificial heating necessary to prevent freezing shall be steam or hot water systems. Generator houses not to be used for the storage of calcium carbide except that contained in the generator. The water in the generator should be kept from freezing. Piping should be underground if possible. All generators should have an escape or relief valve carried outside of building and a safe distance from windows or doors of adjacent buildings. The "sludge" or residue should not discharge into a sewer. No surface water should be allowed to flow or drain toward the generator house.

ACIDS should be kept in cool places well apart from other chemicals and in many cases separate from each other. Fires are best fought with water, as organic substances will only feed the fire. Sand and earth are not recommended for extinguishment.

ACID COLORS—One of the processes in the production of acid colors is chlorinating benzaldehyde. The benzaldehyde is placed in a gas heated, enamelled lined, oil jacketted still, and the chlorine passes through the mass while heated at a temperature from 120-160 degrees C. The still should have an asbestos jacket and no woodwork should be near the apparatus. Process is hazardous and should be in a fireproof

enclosure. The colors are then pumped to monteju tanks, filtered and barrelled.

ACID FIRES—Fumes from acids are ordinarily dense, and heavier than air. Therefore, contrary to the general custom, a stooping attitude should not be adopted when approaching such fires as the fumes tend to settle near the floor. Large quantities of water should be used especially on nitric or sulphuric acid. Small amounts of water make steam which gives off fumes by absorbing the acid.

ACID WORKS—Note the construction and arrangement of roasters and furnaces, glauber salts dryers and nitric retorts; arrangement and method of storing nitre and nitre bags; condensers; condition of pyrites burners, Glovers tower and Gay-Lussac tower, the stills, mills for grinding nitre cakes, the elevator boot and legs, the shafting, sulphur storage, reclaiming lead pans, sealing and packing of carboys. Only fair insurance risks.

ACRALDEHYD—A corrosive and inflammable liquid. Boils at 125 degrees F.

ACT OR NEGLECT—See Knowledge or Control of the Insured.

ACTINOLITE—A silicate of magnesia, iron and lime with alumina. Used in combination with asbestos and a secret binder in making a newly patented mould for casting metals.

ACTION OF CHEMICALS ON WATER—See Water.

ACTION OF WATER ON FIRE—It reduces the temperature, prevents oxygen from reaching the burning mass, breaks up the burning matter and allows water to strike the heated materials. Sufficient water must be used to cool the material not only below the burning point, but below the flashing point.

ACTORS—Lines on household furniture are not very attractive, unless the applicant is personally known to the broker as reliable and at the "top of the ladder" in his profession. The value is mainly personal effects and wearing apparel which must be constantly renewed "to keep in style." As this becomes out-of-date, the moral hazard becomes pertinent. See Furnished Rooms.

ACTUAL CASH VALUE is the cost to reproduce the

property at the time the fire occurs, on the then prevailing prices of labor and material less the actual depreciation. The only way to scientifically secure the sound value is to ascertain the cost to replace the property with new and deduct the actual depreciation.

ADDITIONS TO BUILDINGS—Inspectors should always report on makeshift additions or extensions. A number of fires have entirely destroyed well constructed buildings which had a temporary addition attached.

A. D. VALVE—Is an air-disc valve.

ADELITE—A paint and varnish remover. Explosive. Inflammable.

ADIPOCERE—A kind of grease obtained from decayed animal matter in damp places.

ADJACENT—Near but not adjoining.

ADJOINING—Buildings are adjoining when they are built against each other.

ADJUSTER—Merchandise losses present many angles to the adjuster; they may be partial or total; there may be loss by smoke to cast iron presses, or water damage to a water-pump intended for pumping water out of a mine. Such claims have been made and, unfortunately for the credit of the profession, have been allowed. Claims for smoke damage to cigars in air-tight tin cans covered with wood, because of fire 2 or 3 doors away, have also been allowed; claims for smoke damage to various classes of stocks because of fire next door or in the next block are so common that the merchant who does not make a claim for smoke damage when there is a fire anywhere in his neighborhood is looked upon by underwriters as an oasis in the desert. Allowing loss on property that does not show damage, and that is not damaged indicates weakness in the adjuster, sometimes manifested in order to get business, but more times because he has not the backbone to be fair to the insured and to the company, or because he does not take pains to place the so-called damaged property before the insured and insist upon the damage thereon being shown. The adjuster must hail from the State where "Show Me" is the slogan; the adjuster should be *ignorant and helpless; ignorant* on values until shown, and

helpless because he is compelled to follow the contract made by the company and the claimant. Probably not over one loss in fifty on merchandise comes under the heading of a book loss; the other forty-nine are damage or damage-claimed losses, to be closed by examination of the property and agreement on appraisement of the amount of loss thereon. In all cases where the total loss on goods does not exceed, say 10 to 15 per cent. of the stock, taking the claimant's verbal statement of the amount of and class of goods in the part of the building where the fire occurred, verifying his story by the débris, agreeing on the amount of loss on the total loss to the stock, and then fixing the loss on the damaged goods by agreement or appraisal, is safer than settling by the books. Where the loss must be adjusted by the books, the inventory should be verified by the previous year's books in order to detect any case of double entry or purchases charged twice, or stuffing the inventory. This applies particularly to branch stores, or to stores doing a losing business, where stuffing the inventory might be necessary to maintain the character of the branch manager or the credit of the concern. The net inventory, the purchases at net invoice, the per cent of freight on net invoice, makes up the total to be accounted for at invoice and freight. The safe cash and credit; the per cent of profit over invoice cost, and all other transactions as noted in the statement of loss should be ascertained and agreed on in writing by the adjuster and the claimant before proceeding to find the net cost. Proofs should not be made up for the total loss if there be any pending unsettled questions; as a claim for total loss can be admitted at any time. The adjuster's certificate on the proof as to the amount of and honesty of the loss should be dispensed with, as it is a bad feature if the claim be contested because of acts or facts ascertained after the adjustment. When the loss to the property is fixed, ownership, names of owners, chattel mortgages, gasoline and other factors that might throw more light on the loss should be inquired into and reported with proof, but in cases where the policy is voided by acts of the insured or others, and *admitted by him, the inquiry must stop.*

The warm, dry climate west of the Rocky Mountains enables the adjuster to have the damaged goods cared for without a salvaging plant. He is not compelled to deal with a salvaging company. The adjuster in the warm, dry zone in the West can wait until the assured does follow the policy conditions without the liability of further loss from rain or snow. The causes for patronizing salvage plants to dry out and renovate stocks drowned with rain or preserved in ice, in the rainy, freezy zones in the East, do not apply to the dry, warm zones of the West, and there is no excuse whatever for not adjusting the losses in the warm, dry zones under the policy contract and thereby not adding a 30 per cent to 40 per cent cost of salvaging and selling to the loss.

The adjuster must keep in mind human nature, that every woman overestimates her baby and every man overestimates his horse; and that the fair-dealing claimant who was reasonably fair on 90 per cent of the articles is not of the "hog-it-all" class, but is influenced in his mind by the same human nature that controls the mother, or the property owner, and must sometimes be paid for "mental" damage—a salve, as it were.

The adjuster (if not posted on the class of goods) should employ an expert (not an appraiser or a salvage dealer) to advise him; and with the insured and his adviser, if he chooses to have one, pass on the stock, article by article, agreeing on and entering the loss on each article in the inventory schedule; and in the event of disagreement of the loss on any article or articles, or whether covered or not by the insurance, such articles should be passed to be taken up in closing the loss.

There is no investment that pays so well as the time taken by the adjuster in assisting and directing the insured to clean up, put stock in order in a dry, clean place, using coal oil stoves for drying out purposes when necessary.—Fireman's Fund Record. See Loss Adjustment; see also Proof of Loss.

ADMIRALTY METAL is an alloy of copper, zinc and tin. *Used in engine making.*

ADVERTISING CONCERNS—Mild hazard, consisting of

artist's rooms where designs are drawn or painted, tube colors being generally in use. Storage of plates and cuts (some very expensive), patterns and mailing records. The latter may form considerable of the value, and should be kept in duplicate or in fire-proof cabinet.

ADVERTISING MATTER—Lines should be written cautiously. Stock may be obsolete; very susceptible.

ADVERTISING NOVELTIES consist of cheap jewelry, paper, metal or wood boxes, leather and celluloid goods.

ADVERTISING TAPE consists of strands of heavy cotton thread, glued together to form a narrow ribbon on which the advertiser's name is printed. Used for tying up packages in place of ribbon or cord. Process,—a number of spools or cones of thread are placed on a rack, the thread is drawn through a gas-heated glue pot and converges in a slot, wound on a large wooden reel of slatted wood and dried by steam coils or gas radiators placed under the reel. The ribbon is spooled, and printed by being drawn through two small inked rolls on which the printing type is affixed. Hazard of glue heating, gas stoves and oily waste.

AERO FIRE ALARM SYSTEM consists of a number of loops of fine copper tubing filled with air (and fixed to the ceiling), the expansion of which operates the detector of the particular section affected. The principle is the natural expansibility of air with a rise of temperature.

AEROPLANE FIRE FIGHTING—The employment of aircraft promises before very long to revolutionize all systems of fire fighting.

Every year many valuable farmsteads, mansions, historic places of interest and isolated factories in the country are "gutted" owing to lack of water or delay in the arrival of the local fire brigade. And occasionally we hear of an appalling train disaster—largely because of the absence in remote localities of all means of dealing with the subsequent outbreak of fire. This need no longer be.

Shortly there will be aircraft stations all over the country, and their numbers will increase with the advancement of commercial enterprise. These will be available as "emergency" or fire stations, where specially constructed machines

can be held in readiness to be dispatched immediately on receipt of a wireless call.

Once started, an organization of this kind will soon develop into a great force.

An S. O. S. call would bring this force to any place where it was instantly needed. A machine of the Handley-Page type could probably carry several chemical fire extinguishers of, say, 100 gallons capacity each, and a quantity of rubber-lined hose.

Assuming an outbreak of fire occurred at a mansion or farm where an adequate supply of water was not available and had defied the efforts of the local fire brigade (who generally arrive when a building is "well alight"), the emergency plane, called by wireless, would land as near the fire as possible, connect up the hose to one of the cylinders, and tackle the flames with jets of fire-destroying liquid. It could be equipped with turbine motor pumps, also a large extension ladder constructed of aluminum frame work.

During the explosion at the Gillespie shell loading plant at Morgan, N. J., October, 1918, an aeroplane flying at an altitude of 1,000 feet was used to direct the fire fighting force during the conflagration. The observer was able to make out openings in the walls of fire and wreckage through which men could be sent to check the spread of flames, thereby probably preventing further loss of lives and property.

Once aircraft is employed to deal with fires much valuable property and stocks of farm produce will be saved from destruction.

AEROPLANE MANUFACTURING consists of power and hand woodworking, gluing, metal working, wiring wood parts together, covering planes and rudders with linen, varnishing wood parts and propellers, coating fabrics with lacquer having a cellulose base. Main hazards are storage and use of large quantities of lacquer, woodworking, testing gasoline motors, glue melting. Usually located in old buildings, large open areas subjecting whole plant to one fire, and contents very susceptible. A small amount of heat will render a machine valueless on account of removing the temper of guy wires, braces and weakening the framework and

structure. The highest grade of Irish linen is used for covering aeroplane wings.

Dopes for Aeroplanes—Two classes of "dope" are now in use, and the first class, comprising varnishes, consists essentially of a solution of cellulose nitrate or pyroxylin, the second class comprising the varnishes made by dissolving cellulose acetate. According to a paper presented by Gustavue J. Esselen, Jr., before the Northeast Section of the American Chemical Society.

The great outstanding difference between the coatings given by cellulose acetate and cellulose nitrate dopes is the inflammability of the latter, a difference which will probably be emphasized more and more as the use of aeroplanes for peaceful purposes increases. Cellulose acetate dopes leave a non-inflammable finish. The relative behavior of the coatings left by the two types of dope is well illustrated by the fact that some gasoline can be poured on the piece of fabric coated with a good cellulose acetate dope and allowed to burn, and the fabric does not ignite. The same test applied to a pyroxlin-coated cloth results in the immediate ignition of the coating, and in a very short space of time there is nothing left of the fabric or coating but a puff of smoke. S. T. Skirrow.

AFFIDAVIT RISK—A risk on which the licensed companies have all the insurance they care to write, so that it is necessary to secure insurance from unlicensed companies, through brokers, who, in some States, are authorized by law to be specially licensed for that purpose.

AFFINITY OF CHEMICALS—The phrase chemical affinity is sometimes used to denote attraction. It signifies a tendency of different kinds of matter to unite with each other.

AFRICAN BLACK WOOD—A species of hard wood extensively used in making clarinets and fifes.

AFTER DAMP (choke damp) mixture is carbon anhydride and nitrogen resulting from explosion of fire damp. See Choke Damp.

AGAR-AGAR—*A form* of varnish derived from sea weed.

AGAVE—A fibre, native of Mexico, called "patent hair," a substitute for horse hair.

AGENT—The authorized representative of a company with power to commit a company to liability, make endorsements, collect premiums, sign policies and other similar duties. Receives an over-riding commission above the usual brokerage. In some States, an agent who desires to solicit insurance as a broker must secure a broker's license. See Broker.

AGITATOR—A paddle or similar contrivance used to stir or mix material in a kettle or tank while in process of manufacture.

AGRICULTURAL IMPLEMENTS—Principal hazards are woodworking, considerable painting and varnishing, foundry, and extensive machine shop.

AIR-BRUSH—A sprayer operated under air pressure for spraying liquids. When inflammable liquids are sprayed, the air-brush should only be operated under a hood with a fan installed to suck the vapors outside of building. Room in which spraying is done should be cut off from balance of floor by vapor-tight partition.

AIR COMPRESSOR—An air pump worked under power for delivering air under pressure for various purposes.

AIRCRAFT INSURANCE—The fire insurance companies writing aircraft coverage are having all the experience with losses that they could ask for. Indeed, nose-dives to escape claims, so to speak, occupy the underwriting pilots almost to the exclusion of other considerations. The majority of losses result from collisions with trees, houses, etc. Nor is the moral hazard absent. To be sure, no pilot is going to take a chance of breaking his neck while in the air in order to cash in his insurance policy, but there is plenty of opportunity for questionable proceedings while on the ground. Matches can do plenty of damage in hangars, and the high-powered engines are a menace in themselves unless watched with the greatest care. Then, too, at least a thousand of the inferior type of machines manufactured for the Canadian Government have been bought in this country, and many of the craft built by our own Government are

already half-obsolete. The significance of such a condition needs no comment. Among the considerations closely scanned by the underwriters may be mentioned the type of machine, make and condition of engine, and the experience and character of pilots. The latter is the most important feature. It takes a higher rate to insure a machine piloted by a professional than one driven by an amateur and owner. This may appear odd at the first flush, but the reason lies in the additional "chances" the professional is willing to take. Indeed, it has been stated by competent underwriters that the time will probably come when pilots will have to be listed and classified much as ships are in the classification registers of the American Bureau of Shipping, Lloyds, the Bureau Veritas, etc.—The Weekly Underwriter.

AIRPLANES—See Aeroplanes.

AIR SHAFTS—Fires in such shafts are usually disastrous as they travel from cellar to roof and mushroom on every floor. See Shafts.

AIR SPACE—The intervention of an air space preventing direct contact of combustible material with the heated body is essential. This prevents the combustible material attaining a dangerous temperature. One of the best known insulators for either heat or cold.

AISLES—Should be maintained in all warehouses or risks where bulk stock is kept to allow of easy access to all parts of the floor in case of fire, and at windows so that a passer-by could see the interior and so detect fire and also to allow firemen to enter building. Aisles should be 2 to 4 feet wide. See Clear Space.

ALARM, AUTOMATIC—A thermostat placed on ceilings, spaced about 10 feet. Heat expands a diaphragm which causes contacts to complete an electrical circuit which sends an alarm to a central station. See Central Stations.

ALARM, THERMOSTATIC—Alarms consist in brief of two plates which are sensitized to heat, or a thermostatic strip between two plates. A rise in temperature forces the plates together, *causing an* electrical circuit which transmits *the alarm. Spacing of* thermostats is regulated by the various

rating bureaus. See Fire Alarm System; also Combination Red Fire Alarm Box.

ALARM VALVE—Usually a part of a sprinkler system so designed that when water flows through the sprinkler pipes an alarm is transmitted to a central station or to the engine room in the building. See Variable Pressure Alarm Valve.

ALBUMEN—May be obtained from blood or from eggs. Used by calico printers as a mordant. Manufacturing may be hazardous on account of drying and heating apparatus.

ALCOHOL (ethyl or grain)—Distilled from grain. Flash point about 55-70 degrees F. Denatured alcohol, flash point about 55 degrees F. Methyl or wood alcohol, inflammable, distilled from wood, flash point about 32 to 60 degrees F. All alcohols give off vapors depending upon the degree of temperature. Can be extinguished with water. See Wood Alcohol.

ALCOHOL DISTILLERIES—Distilling from high wines and juices of fruits or grains. Setting of, and ventilation of furnaces important. Stills to have plenty of ventilation. Storage to be in separate building. A poor class to insure.

ALCOHOL RECLAIMING—Used alcohol placed in steam-heated mixing-tank with agitator, treated with fresh alcohol and other ingredients and then distilled in steam kettles, the alcohol passing through various water-cooled rectifiers and then put in drums. Distilling apparatus should be in well-ventilated buildings.

ALCOHOL (Solidified) is put up in cube form for cooking and heating. It can be used on a sheet of metal or asbestos without a burner.

ALDEHYDES—Derived from sulphuric acid, alcohol and bichromate of potash. Volatile and inflammable. It is the intermediate product in the oxidation of an alcohol to an acid.

ALIEN—See Enemy Alien Clause.

ALIGNUM FIRE DOORS are a composition of raw ground asbestos mixed with silicate of soda and placed between two sheet metal plates greased with paraffin to prevent adherence. Wood strips about 2 inches square are used to form the shape. Material is then placed in a hydraulic

steam press to compress the substance, and the heat drives the moisture out. Wire mesh or screens are sometimes placed in the mixture. Doors may or may not be metal covered. The only woodworking is the occasional cutting and planing of wood strips to size. Class may be likened to a general metal worker but susceptibility and heat and painting hazard. Sometimes use small quantities of zapon for giving a finished surface. Zapon is a highly inflammable lacquer with a cellulose base.

ALIZARINE—One of the precipitates of madder produced by boiling the madder and adding an acid. It forms the basis of many dyes. Slightly soluble in hot water but dissolves in alcohol or ether. Alizarine is also produced from anthracene. The anthracene is crushed, treated with bichromate of potash and sulphuric acid, boiled, filtered, distilled and dried. Anthraquinone thus obtained is treated with oil of vitriol and sublimed. Several recent fires resulting in explosions were caused by grinding alizarine color, in a dry state, in ball mills. This is a slow grinding process and demonstrates that alizarines are very apt to ignite spontaneously from any kind of friction. One fire was caused simply by emptying a barrel of alizarine into a mill which was not operating, and was probably caused by static electricity.

Alizarine brown—Derived from picramic acid or from anthracene.

Alizarine (soluble) blue color is made by mixing aniline blue with sodium bisulphite.

ALKALI—A substance capable of combining with and thereby neutralizing or counteracting acids. Is a strong caustic base.

ALKALOIDS—A basis nitrogenous substance found in plants, composed of nitrogen, oxygen, hydrogen and carbon. Most of them are non-volatile solids. Coniine and nicotine are liquid alkaloids and are volatile and inflammable.

ALLOY—When metals are melted and mixed together they form alloys.

ALLYLIC ETHER—A highly inflammable liquid.

ALMOND OIL is used in pharmacy for making emulsions and ointments.

ALMOND PASTE manufacturing. Grinding and crushing almonds, mixing and cooking in steam heated kettles with glucose.

ALMS HOUSES—Correctional institutions and insane asylums have a severe moral hazard due to the defective mentalities and proclivities of the inmates, such as pyromaniacs, which might take a vicious turn and set fire to the building to escape therefrom. Sometimes consist of a number of buildings communicating by frame enclosed passageways. Usually of a large area, with open shafts and well holes. Boiler house, kitchen, laundry, paint and carpenter shops, also attics used for storage are important hazards. See Asylums.

ALOETIC ACID—From aloes by nitric acid process. Explodes with heat.

ALPHABETICAL LIST—A rating bureau booklet containing charges to be added to the "base rate" for goods in storage stores. See Storage.

ALTERATIONS—See Builders' Risk; also Mechanics Privilege.

ALTERNATING CURRENT—Difference between direct and alternating current: Direct current flows continually in one direction; alternating current flows back and forth, constantly changing direction around the circuit. A direct current of same voltage is considered slightly more dangerous. Abbreviation is A. C.

ALTERNATING MOTION—Up or down, or backward and forward, instead of revolving.

ALTHIONIC ACID—Obtained by the action of sulphuric acid on alcohol. Very inflammable.

ALUM POTASSIUM (aluminum sulphate)—Can be used as good fire-extinguishing agents.

ALUMINA—Is an oxide of aluminum. Commercially used under the name of alundum.

ALUMINATES—Compounds of aluminum with potassium or sodium hydrate.

ALUMINUM—*A white metal which melts at about 1217*

degrees F. In powdered form, burns readily. Made by electrolizing a solution of bauxite in molten cryolite.

ALUMINUM PAINT—See Bronzing Liquids.

ALUMINUM POWDERS are of different degrees of fineness, the finer forms being extremely hazardous on account of the ease with which they may become ignited. Water when applied to the burning powder increases the force of the flames and may create an explosion. Manufacturing is done by pulverizing aluminum in a stamp mill, sifting to grade according to size and then polished. The dust or powder of aluminum collects on shelves and other places which facilitates the spread of fire. In manufacturing establishments, a blower system should be provided to remove the dust, and all electric light fixtures should be of the marine style, switches enclosed, and there should be no open flames. Many disastrous fires have taken place in this class. See Bronze Powders.

ALUMINUM SULPHATE—A salt prepared by decomposing a clay with sulphuric acid. Used as a sizing in cheap grades of paper and as a mordant for cotton goods.

ALUNDUM—An oxide of aluminum. Used as an abrasive and as a refractory. See Alumina.

ALVA MARINA—Derived from seaweed. Used by upholsterers. Claim not subject to spontaneous combustion.

AMALGAM—A combination of any metal with mercury.

AMALIC ACID—Obtained by action of chlorine on caffeine.

AMATOL—Used in loading shells. Composed of nearly equal proportions of TNT and ammonium nitrate. The mixture is used as a substitute for the pure TNT.

AMBER—A fossil resin. Inflammable. Highly electrical when rubbed. Used extensively for pipe stems. Imitation amber may be celluloid or gum resins.

AMIDE POWDER—A volatile and explosive compound.

AMIDIN—Soluble portion of starch.

AMMETER, AMPEREMETER—An instrument for measuring the amperes of electrical current flowing in a circuit.

AMMONAL—An explosive. Is powdered aluminum, mixed with nitrate of ammonia.

AMMONIA is a gas composed of hydrogen and nitrogen. It is easily liquefied under pressure, and consequently is employed generally in refrigerating plants. In such plants explosions are frequent, owing to the escape of the gas. Chiefly obtained as a by-product in the manufacture of illuminating gas from the distillation of coal, and from the manufacture of coke in by-product coke ovens. Ammonia will kill almost instantly when a fire breaks out where ammonia is used, therefore no one will stay to fight it and the plant burns unless the firemen are equipped with helmets. In cold storage risks, heat has been known to expand the cold air to such an extent as to burst the walls of the building. It is soluble in water, the solution commonly called aqua ammonia. Sometimes used to extinguish fires in ship's hold or other confined spaces. Not inflammable. See Refrigeration.

AMMONIA ALUM—Prepared from aluminous shale, dissolved in sulphuric acid, after which ammonium sulphate is added. Used as a mordant.

AMMONIA CYLINDERS—In case of fire the heat will cause the gas to expand and cylinders to burst (coils usually have lead joints which expand and prevent rupture).

AMMONIACAL LIQUOR—Formed during distillation of coal-gas. Will extinguish fire.

AMMONIA HELMET as manufactured by American-LaFrance Fire Engine Co., consists simply of a sturdy leather helmet which is pulled over the head, and a tank which is swung from the shoulder. By means of a flexible metallic tube, pure air from the tank is passed to the interior of the helmet, thus affording the wearer an ample supply of pure air; simply opening a valve makes the outfit ready for action.

AMMONIA REFRIGERATING MACHINERY—Protection from Hazards of Explosion—Lessons from a Typical Fire—A report issued December 26, 1918, by the New York Board of Fire Underwriters and the New York Fire Insurance Exchange on an ammonia explosion in a compressor room, May 11, 1918, of the Merchants Refrigerating Company,

Tenth and Eleventh Avenues and 16th and 17th Streets, New York City, gives valuable suggestions for safeguarding this hazard as follows:

One of the 225-ton ammonia compressors was in operation on the evening of the accident. The construction of the plant was completed, except for the hanging of a few doors on the lower floors and testing the automatic sprinkler and refrigerating systems. The chief engineer of the plant, with an assistant engineer and two oilers were in the engine room in the vicinity of the 225-ton compressor which was in operation at the time of the accident. Apparently a bolt on the bearing of the connecting rod at the crank shaft broke which caused a disarrangement in the crank case. The compressor which had been turning at 208 r.p.m. stopped instantly and the water jacketted cylinder was wrecked. The centrifugal force of the fly wheel caused it to break up into numerous pieces, which tore down pipes in their path, also gouged several holes in reinforced gravel concrete columns to a depth of 2 inches. The building columns were in the plane of projection of the fly wheel and this prevented the flying parts from doing extensive damage to other machinery. The engine room immediately filled with ammonia gas and the employees of the engine force, who escaped, were almost suffocated from the fumes. A fire alarm was sent in immediately after the accident at 7:02 P. M.

Suggested Protection—This and previous explosions, as well as laboratory tests show that pure ammonia vapors mixed with air in certain proportions will explode, if ignited. For practical purposes it is immaterial whether the chemical explanation attributes the explosion to hydrogen gas liberated by a decomposition of ammonia, or to some other cause.

All exposed fire and flame must therefore be excluded from the ammonia refrigerating machinery rooms and other places subject to the accidental discharge of large quantities of ammonia.

The spark which caused the explosion of ammonia vapor in this case was apparently due to an electric arc established between two bare metal terminal lugs of a 7,500-volt oil switch. *A space of 8 inches* across a slate surface formed the

insulation between the terminals. This insulation seems to have been reduced sufficiently by the moisture laden vapors resulting from the discharge of ammonia and cooling jacket water to establish an arc between the terminals as evidenced later by fused copper thereon.

An insulating covering is therefore considered essential, for all live metal parts of every electrical equipment having a potential in excess of 600 volts.

All electrical equipment not essential to the ammonia refrigerating machinery room should be separated therefrom and consideration should be given to the advisability of preparing special requirements for the electrical equipment in ammonia refrigerating machinery rooms.

There should be a service switch controlling all the electrical equipment in a refrigerating machinery room; this switch should be outside of the room and located where it can be safely reached and opened in case of an accidental discharge of ammonia.

AMMONIA WATER—See Aqua Ammonia.

AMMONIUM CARBONATE—When heated gives up ammonia very rapidly. See Heat Liberation.

AMMONIUM HYDROXIDE—See Aqua Ammonia.

AMMONIUM NITRATE—See Heat Liberation.

AMMONIUM PICRATE—A crystalline powder of yellow color, highly explosive.

AMMONIUM SALTS are volatile.

AMMONIUM SULPHATE—Derived from gas works; principally used in fertilizer plants. Not considered hazardous.

AMMUNITION—Not necessarily the same as munitions, the former applying to explosives and the latter to supplies of war.

AMMUNITION FACTORIES—Blending, dry houses and loading of fuses are the most hazardous. Loading fuses, if properly arranged, is not dangerous. Powder house, drying, and blending-houses are seldom insured.

AMMUNITION IN FIRES—Does not explode simultaneously. Gun Powder in bulk, i. e., kegs, will explode with *force. One keg exploding* may tear open other kegs and

flash the fire from one to the other so rapidly that the explosion seems to be simultaneous. An exploding cartridge has not sufficient force to tear open an adjacent cartridge, and cannot therefore communicate fire to the powder charge of the adjacent cartridges.

AMOLENE—A benzine substitute, classed as kerosene.

AMPERE—The electrical unit for measuring current, as 200 amperes. An ampere is that current which one volt will force through one ohm of resistance. Abbreviation is A.

AMPEREMETER—See Ammeter.

AMUSEMENT ENTERPRISES—Usually large area, light frame construction in sparsely settled locations; season occupancy only. Fires caused by cigarettes and matches. Bad fire record.

AMYL ACETATE—Prepared by treating amyl alcohol with acetate of lime in the presence of sulphuric acid and distilling. A clear, colorless liquid, having an odor like bananas. Used as a solvent for nitrocellulose. Flash point 65 to 70 degrees F. Boils at 257 degrees F. See Banana Oil.

AMYL ACETATE LACQUER (Pear Perfume) contains celluloid in solution.

AMYGDALIN (from bitter almonds) contains a volatile oil.

AMYLIC ETHER—See Potato Ether.

ANALYTICAL LABORATORIES—See Laboratories.

ANÆSTHETICS—Volatile liquids (used to produce anæsthesia), such as ether, chloroform, nitrous oxides.

ANGLE IRON—A bar of iron with cross section shaped like the letter "L" or at an angle of 90 degrees.

ANGOLA is a mixture of cotton and wool.

ANHYDRIDE—A substance which with water forms an acid. See Hydrates.

ANHYDROUS AMMONIA, by reason of its ability to liquefy under comparatively low pressure, is most generally employed in refrigerating and ice making machines. See Ammonia.

ANHYDROUS SALTS are salts when free from their water *of crystallization.*

ANILIC ACID, obtained from action of nitric acid on indigo.

ANILINE is ordinarily made by reducing nitrobenzene with scrap iron and hydrochloric acid. The manufacture of aniline is very hazardous as inflammable vapors are given off.

ANILINE DYES—Roughly speaking, they are divided into classes, thus direct colors for cotton goods, acid colors for wool, basic (sulphur) for paper, cotton and pulp, chrome for wool, oil colors soluble in oil. Concentrated colors are reduced by mixing with salt (chloride of soda) called "standardizing." Process consists of cold mixing in wooden tanks, boiling in steel tanks, kettles and retorts (some under pressure), gas or steam heated. The raw materials are aniline oil, naphthalene, nitro-benzole, nitrotoluol, nitrophenol, zinc dust, sodium nitrate, sodium nitrite, nitric acid, fuming and concentrated sulphuric acid, muriatic, hydrochloric and acetic acids, caustic soda, sodium bisulphite, carbolic acid, dimethyl and ethyl aniline, saltpetre, castor oil, barium peroxide, prussiate of potash, bichromate of potash, red oil, hydrogen peroxide, salts, etc. The first process is to make the intermediates (use dimethyl and ethyl aniline and similar substances) or base for dyes, and then to produce and precipitate the colors themselves, followed by drying, grinding and mixing of finished colors. Some of these chemicals are inflammable and carelessness or accident will cause fire or explosion by combining certain chemicals. Large quantities of chemicals, alcohol, acids, and oxidizing agents are a source of danger.

In nitrosating, chemicals (usually dimethyl and diethyl aniline) are placed in wood tanks with water, ice and acids, then treated with solution of sodium nitrite and acids, dried in centrifugal extractors.

Autoclaves are used in manufacturing intermediate aniline products such as dimethyl and ethyl aniline (a mixture of aniline oil, alcohol and acids). They are steel retorts, asbestos clad, heated by direct gas heat, under pressure, to about *350 degrees* F., and developing and maintaining a pressure of *about 500 pounds for* several hours, the resulting product

contained therein and thus formed is treated with alkalies, redissolved and washed. Autoclaves should have a relief valve of one-half inch and vent and smoke pipes, also a hood with suction fan to draw poisonous vapors to the outer air.

Color drying and grinding and alcohol reclaiming are severe hazards. When grinding dry colors, fires are so frequent that an employee is usually stationed at the grinder with a hose or fire extinguisher. See Paste Colors. See Color Works.

ANILINE FULMINATE—Explodes violently when heated to about 200 degrees F. It decomposes when exposed to daylight.

ANILINE SPIRITS—Same as Stannic Chloride.

ANIMAL CHARCOAL (or Bone Black) consists of a charcoal formed by the destructive distillation of bones. Non-inflammable solid. See Charcoal.

ANIMAL DUST—Is not as hazardous as mineral dust. Blowers from buff wheels such as used by shoe repairers may be connected to a burlap bag instead of a metal can.

ANIMAL FATS—Naturally support combustion and their presence in large quantities are viewed by underwriters with suspicion, as fires once started are very difficult to extinguish.

ANIMAL FIBRES are not so easily lighted as vegetable fibres and they burn slowly and will continue burning only when the combustion is supported by some source of heat or by a strong draft. A combination of vegetable and animal fibres causes the combination to become as susceptible as though it were all vegetable fibre.

ANIMAL HAIR—Usually shipped in bales bound with wire.

ANIMAL OILS are divided into two classes—the first class is prepared from the fat of land animals, while the second class is derived from fish or some of the warm blooded marine animals. They are inflammable and would readily assist a fire in a building, but are practically without the spontaneous combustion hazard except when mixed with some *fibre. See Vegetable* Oils.

ANIMI—A resinous gum used in varnish manufacturing.

ANNATTO—A yellow-red pigment, chiefly used in dyeing silk.

ANNEALING—The heating and gradual cooling of metals, glass, etc., for the purpose of removing brittleness or decreasing ductility. High temperatures required and setting of furnaces important. Rules for setting are the same as for other gas heated appliances. Floor should be protected in the same manner as a forge.

ANNEALING FURNACES (used in glass works), resemble ordinary bakers' ovens, arranged in series of three or four adjoining, and heated by gas flames. The hot glassware is introduced by hand and removed from one oven to another, each being heated at a reduced temperature to perfect annealing without rupture.

ANODE is the name given the terminal of which the current enters the solution, while the plate, where it leads, is called the cathode.

ANTHRACENE—A product of the distillation of coal found in the residual tar. Boiling point about 550 degrees F. Anthracene is separated from the tar distillate by cooling and freezing, and is finally purified by washings in naphtha. This process should only be done in a detached building and there should be no artificial light or heat therein.

ANTHRACITE—See Coal.

ANTI-AIRCRAFT REFLECTORS or mirrors. The mold is a large solid piece of glass in the shape of a bowl. The glass is placed in a wooden rim to facilitate handling, and the wood is covered with wax so that acid will not eat the wood. The glass is metalized (covered with a coating of bronze powder, nitrate of soda, lead, etc.) and copper deposited thereon by the usual electro-plating process, then it is backed up with papier-maché and the deposit is lifted off the glass. It is the deposit which is used for the mirror. Formerly glass was used but this proved expensive because it is easily broken, and each glass cost from $300 to $1,000.

ANTICHLORE is the sulphite of soda used by paper makers.

ANTIMONY—*The* ore is iron gray. The antimony is tin-

white in color, brittle, fusible, vaporizable. Used in metallic alloys as type metal, bell-metal, tinfoil. Shipped for export in blocks in boxes wrapped in burlap and bound with rope. Oxidizes when very hot. Its oxide is volatile.

ANTIMONY SULPHIDE, used in match heads, very inflammable and in burning gives off sulphur dioxide.

ANTIQUES—Usually consist of porcelains, furniture, draperies, odds and ends of novelties. The collection of antiques is usually a hobby and in the eyes of the owner, the value increases in the event of a fire. Should not be insured unless inventoried. Dealers in high class goods usually keep the smaller and more valuable articles in a vault. Real antiques cannot be replaced, and, like old wine, the value increases with age. The moral hazard is important. Inspection and mercantile report required by most underwriters. Antiques, so-called, are being made in factories devoted to that purpose. See Art Galleries.

ANVIL MANUFACTURING—Hazards of machine shop, foundry, pattern shop and storage. Large drop hammers are sometimes used, and small fires may so affect them as to warp the beds of the hammers and render them useless, except as old iron.

ANVILS—The combustible floor, 4 feet all around, should be protected against falling red-hot particles.

APARTMENT HOTEL—A hotel in which apartments are rented in suites for a term usually not less than a month, in which there are no kitchens, dining rooms or serving rooms, but a common dining room. See Hotels.

APARTMENT HOUSE—A building occupied by three or more families for dwelling purposes only. The "New Law" apartments (of New York City) are much more desirable risks than the old type in that the grade floor, and sometimes the second floor, is of fire-proof construction; i. e., brick, terra cotta, or concrete arches on steel beams, and the hallways and dumbwaiter shafts throughout are either brick, terra cotta, or plaster block with metal-covered (kalameined) doors at openings. The exterior light courts are usually very large.

The old type of apartments are of the ordinary joisted

floor construction; the floor openings, such as stairways, vent shafts and dumbwaiter shafts, are of combustible material. The exterior light courts are usually very small and have ordinary windows facing the windows of adjoining buildings in the row. Many fires have traveled from one building to another through these exterior (or interior) shafts. See Dwellings.

APEX—A point in either chord of a truss where two web members meet.

APOTHECARIES—See Drug Stores.

APPLICATION FOR INSURANCE—Legally, it should be made and signed by the applicant. In common practice, an application is made verbally or the facts concerning the proposed insurance are filled in by the agent or broker. It should state the name, location, amount, date of commencement and expiration, property covered, liens and encumbrances. See Binder.

APPRAISAL—According to the N. Y. Standard Policy. In case the insured and this Company shall fail to agree as to the amount of loss or damage, each shall, on the written demand of either, select a competent and disinterested appraiser. The appraisers shall first select a competent and disinterested umpire; and failing for fifteen days to agree upon such umpire then, on request of the insured or this Company, such umpire shall be selected by a judge of a court of record in the State in which the property insured is located. The appraisers shall then appraise the loss and damage stating separately sound value and loss or damage to each item; and failing to agree, shall submit their differences only, to the umpire. An award in writing, so itemized, of any two when filed with this Company shall determine the amount of sound value and loss or damage. Each appraiser shall be paid by the party selecting him and the expenses of appraisal and umpire shall be paid by the parties equally.

APPRAISALS FOR CO-INSURANCE—When it is desired to insure buildings held by trustees, executors, administrators or others acting in a fiduciary capacity on behalf of minors or incompetents, a certified appraiser may be en-

gaged to fix the amount in advance so that the policies will comply with the provisions of the co-insurance clause. Appraisers' fees are usually as follows: Valuation $10,000 or under, $10; $10,000 to $20,000, $1 per thousand; $20,000 to $100,000, $20 for first $20,000 and 50 cents per $1,000 in excess over $20,000; $100,000 or over, $60 for first $100,000 and 25 cents per $1,000 for the excess of $100,000.

Cost of Construction and Repair Work—The high cost of materials, supplies and labor in the opinion of a number of prominent builders has caused an increase of approximately 30% and this is based on the following percentage of increases in the various branches of the trade:

On Mason Work	30%
Stone Work	25%
Plastering	25%
Marble and Tiling	20%
Ironwork	40%
Carpenter Work	25%
Metal Ceilings	30%
Plumbing	40%
Steamfitting	30%
Roofing and Metal Work	30%
Painting and Decorating	30%
Electrical Work	20%
Elevator Work	25%

Thumb Rule for Finding the Approximate Valuation of Buildings—On account of abnormal costs, this table should be increased about 33⅓% for present prices:

Frame, 10 to 25c. per cubic foot. Brick, 18 to 25c. per cubic foot (stores and dwellings, six stories or under.) Brick, 18 to 20c. per cubic foot (lofts). Fireproof, 25 to 30c. per cubic foot (lofts). Fireproof, 30 to 40c. per cubic foot (theatres). Fireproof, 35 to 50c. per cubic foot (apartment houses, hotels, office buildings).

Example: A brick store and dwelling. Front, 36 feet multiplied by 85 feet (depth) equal 3,060 sq. ft., times height, *60 feet (10 feet to a story,* including basement of 5-story

building), equals 183,600 cubic feet. At 18c per cubic foot, the cost would be $33,048. Note: In New York City, "New Law" tenements may occupy not over 85 per cent of area of building lot, which is usually 100 feet deep; hence 85 feet depth as above. See Depreciation; also Salvage.

APPRECIATION—The opposite of depreciation. It is a rising in value or increase in worth or value. It was especially noticeable in the increased value of buildings during the late war when building materials were very high in price. To protect themselves, and to comply with the conditions of co-insurance, owners increased the insurance on their properties.

APPROVED—Signifies that the device used has the approval of the Board of Underwriters, and has been tested by the Underwriters Laboratories. Such devices are always labelled.

APRON—A covering of timber or metal to protect a surface against the action of water flowing over it. In theatres, it is the portion of the stage floor which projects into the auditorium. Also has many other meanings.

APYROUS—Capable of resisting the action of fire.

AQUA AMMONIA—A clear colorless liquid. Consists of ammonia gas dissolved in water. Non-hazardous.

AQUA FORTIS is the common name for nitric acid.

AQUA REGIA—See Nitro-Hydrochloric Acid.

ARAKANA is tallow refuse.

ARBATINE—A paint thinner, similar to turpentine.

ARBOR—See Journal.

ARC—Made by electricity; is always productive of heat, the intensity of which is dependent upon the resistance and the current.

ARC LAMP—An electric lamp in which the light is produced by an electric arc formed by passing a current across the space between two carbons. Open arc lamps should never be used where explosives or inflammable vapors, dust or light flyings are present. See Flaming Arc.

ARCADES—See Shooting Galleries.

ARCH, as used in building construction, is that portion of

a floor between beams or girders; or an opening through a wall.

ARCHITECTS—Plans, drawings, specifications and blue prints take a higher rate than the office fixtures. Benzine is used for cleaning smudge marks from tracings. The wise architect will submit the plans for his proposed building to an insurance rating expert before the work is started so that he may obtain the lowest rate of insurance when the structure is completed. See Plans.

ARCO SPOTZOFF—A cleaning fluid, flashes at ordinary temperatures; classed as volatile, inflammable liquid.

ARCTIC AMMONIA OIL—A special mineral oil used in refrigerator systems.

ARDENT SPIRITS are distilled spirits.

AREA OF A BUILDING includes the thickness of the walls. Floor area is the space inside of the walls excluding partitions. The greater the area, the greater are the possibilities of a fire spreading. Areas in excess of 5,000 feet are usually penalized in rating schedules. Fire stops of brick or concrete walls, 12 inches thick, with approved fire doors, should be provided to decrease the area.

AREAWAYS—Fires are spread to basements by means of poorly protected window openings. Pedestrians often drop cigarette butts there and mischievous boys make fires in them. Careless tenants use them for rubbish dumps. See Cellar Fires.

ARECA NUTS—From a sort of palm tree. The juice is used for dyeing.

ARGOLS—The scrapings from the inside of wine casks, from which cream of tartar is made.

ARMORED—A name sometimes used for reinforced when referring to concrete.

ARMORERS' SHOPS—Hazards of storage of military supplies and equipment with incidental stock of ammunition, machine shop for repairing arms, and testing.

ARMORIES—The enormous area and height are the predominating poor features. The height and span of roof require exceptionally heavy walls and supports. Hazards of careless smokers, *armorers' shops*, ammunition storage, paint

shops, stables, mild dance hall hazard and hospital. On January 17, 1917, the Second Regiment Armory at Albany burned causing a nearly total loss. About 2,000,000 rounds of ammunition exploded, impeding the progress of the firemen and rendering fire fighting dangerous and difficult.

ARRIS—The sharp edge or ridge on stone or metal.

ARSENALS usually contain a large amount of explosives. The mixing and blending buildings should be located away from exposed buildings.

ARSENIC ACID—A white crystalline solid not inflammable.

ARSON—The burning of property, usually spite work or for revenge; malicious burning.

ART GALLERIES—Usually large open areas with open or poorly protected floor openings and numerous well holes. The contents, mainly paintings, bric-à-brac, and other easily damaged articles. As a rule they are under careful management, but are subject to severe loss in case of fire. See Antiques.

ART GOODS—A delicate stock usually consisting of a large proportion of fabrics both modern and old, which usually prove a total loss in case of fire, except pure gold or silver threaded goods, which can be smeltered and the precious metal reclaimed. Pictures and bric-à-brac form a large value.

ARTIFICIAL FLOWERS AND FEATHERS—See Flowers and Feathers.

ARTIFICIAL LEATHER—Paper or woven textures coated with varnish and other finishes. Liable to be a hazardous manufacturing process.

ARTIFICIAL SILK is made from wood pulp.

ASBESTIC—A composition mined in Canada containing a large percentage of asbestos.

ASBESTIC PLASTER is made by mixing lime, putty, freshly slaked lime, and a certain percentage of asbestos.

ASBESTOS—A mineral, both fibrous and crystalline. Can be carded, spun and woven. Not affected by acids. Three general classes, amphibole, antophyllite and serpentine. The *first two* are much alike and are silicates of lime, magnesia

and alumina (hornblende). The serpentine is a hydrated silicate of magnesia.

ASBESTOS BOARDS—Used as lumber; are approximately 80 per cent portland cement and 20 per cent asbestos fibre, moulded and pressed into sheets, one-eighth inch to one inch thick, under hydraulic pressure. Can be worked with machine tools.

ASBESTOS CLOTHS—Are very useful for smothering a fire in which liquids are involved. Used by dyers and cleaners throughout England.

ASBESTOS GOODS—Such as paper, textiles, gaskets, washers, curtains, shingles, boards, belt linings and electrical goods. Processes are mixing, grinding, rolling, picking, carding, weaving, spinning, and drying with direct heat. Materials used include benzine, japan, mineral oils, asphaltum, graphite, wax, cotton and excelsior. Hazards include carpenter shop, foundry, metal working, paper and textile machinery, also printing. In making roof paper use paper and cloth saturated with asphalt, oil solutions, cement, and coated with benzine thinned rubber solution. In making tape and washers they do weaving and winding, and treating with rubber cement, then vulcanize. The foundry, mixing house for naphtha, rubber and cement mixtures, the oil house, the benzine vault and japaning room should be outside in separate enclosures. Drying, picking, carding, can soldering and vulcanizing are also important hazards.

ASBESTOS INSULATORS—For pipe coverings and boiler casings are composed of about 85 per cent carbonate of magnesia and 15 per cent asbestos fibre. When applied at least 1 inch thick they are very effective. Applied same as cement. Besides its economic value, it decreases the degree of heat radiated from a boiler or pipe. See Insulators.

ASBESTOS PAINT—See Fire Resisting Solutions.

ASBESTOS ROOFING—In sheets or blocks is preferable to wood or tar paper. Acts as a fire retardant.

ASBESTOS THEATRE CURTAINS—The proscenium curtain shall be composed of asbestos of long, tough, flexible fibre, twisted and wrapped upon substantial brass wire thread and woven into a close, even cloth, 3 feet wide. The strips

Steel Theater Curtain, Lined with Asbestos.

must be lapped not less than 1 inch and sewed with two lines of asbestos and brass wire stitching. All strips shall be in one continuous length the full height of the curtain. There shall be at least 4 laps of the cloth at the top and at the bottom of the curtain to form pockets for the top and bottom bars, and the curtain shall be lapped on the sides to form a continuous reinforcement for the guide clips.

The curtain shall be at least 36 inches wider than the proscenium masonry opening, and at least 2 feet higher than the highest point of the proscenium arch. It shall have wrought iron or rolled steel top and bottom bars proportioned to size to the width of the curtain, but not less than 1 inch by 2½ inches. The top and bottom bars shall be connected by four steel wire cables 3/16 inch in diameter to support the weight of the bottom bar.

The curtain must be supported by steel lifting cables, one at each end and intermediate points not over 10 feet apart. It shall be balanced by a counterweight only to such extent that when it is tripped the descent will be made in 15 seconds. The curtain must operate in guides bolted every 2 feet to the proscenium wall. All apparatus connected with the curtain or its operation shall be of metal. All paint used on the curtain must be incombustible. Underwriters' requirements. See Theatres.

ASBESTOS WOOD—Is made of short fibre asbestos mixed with a secret cement and subjected to a very heavy pressure. It is made in sheets varying from ¼ inch to 2 inches in thickness. After it has been allowed to dry about 30 days it is ready for use and can be sawed, planed, nailed, and screwed in the same manner as wood and with the same tools. It has no grain and therefore no tendency to crack. It is heavier than wood, has a greater compressive strength, but a lesser tensile strength. It is a non-conductor of electricity. Warps very little under a fire and will stand being wet when hot.

ASCHE BUILDING FIRE (Triangle Waist), March 25, 1911, 23-29 Washington Place, New York City, 10-story fireproof, steel and cast-iron skeleton construction, terra cotta arches, *ironwork protected* with cement and tile. Fire sup-

posed to have been caused by a cigarette or match dropped in a basket of clippings. The loss of 145 lives was due principally to locked exit doors.

ASHES should be kept only in metal receptacles, the bottom of which should be raised above the floor. Numerous fires are caused by hot ashes in wooden or cardboard boxes.

ASHLAR—A wall facing of stone, usually of a granular nature such as granite or marble. Easily damaged by direct or radiated heat from an exposure fire, resulting in considerable loss under building insurance policies.

AS INTEREST MAY APPEAR—A phrase used loosely by many persons especially when the assured is a partnership or when two or more firms or persons are joint tenants. When used to cover the interest of more than one person, each is required, in case of loss, to prove his interest in the property. It is poor form to use this clause on a household furniture policy where the interested ones are jointly occupying an apartment and where it would be hard to prove their individual interest. (Henry Wittpenn.)

ASPHALINE consists of bran impregnated with chlorate of potash.

ASPHALT—A bituminous substance which probably owes its origin to a vegetable matter which has been subjected to a slow process of decomposition or decay resulting in the production of a bituminous coal, from which, by volcanic agency, the asphalt has been distilled and diffused over neighboring districts.

ASPHALT WORKS—In most plants the asphalt is already refined when received from the previous plant. It is then placed in coal fired or steam kettles, then roughly mixed with cracked stone and sand from steam heated rotary driers. Platforms around kettles or furnaces should be of incombustible material. Usually located in old frame buildings outside of protection. This class is not considered desirable insurance.

ASPHALTUM—A variety of bitumen arising from decomposition of vegetable matter. Its combustion is rapid.

ASPHALTUM PAINT OR VARNISH consists of asphaltum solution of benzine or other solvents.

ASSAYERS—Careful class of people. Ores are ground, washed and valuable minerals extracted by dissolving same in acid (heated) baths. The minerals are then reclaimed by electricity and melted in annealing and smelting furnaces. The laboratory and acid sections are the most hazardous.

ASSETS are the funds, stocks, bonds or other resources from which the company obtains funds to carry on the business. See Liability of a Company.

ASSIGNEE—A person assigned by a court to take charge of the affairs of an insolvent firm, to wind up an estate or similar functions. See Trade Reports.

ASSIGNEE'S SALES STORES—Goods purchased at low figures may be insured for much larger amounts.

ASSIGNMENTS—In Greater New York, no policy or certificate of insurance covering in any elevator or storage warehouse, private or public, shall be assigned except to cover the merchandise described in the policy and in the same location. In other words, permission may only be granted to change the name of the assured.

ASSURED, OR THE INSURED—The person mentioned in the policy as the legal owner or custodian of property set forth in the form of the policy.

ASTRAGAL—A small moulding about semi-circular or semi-elliptic and either plain or ornamented by carving.

ASTRAL OIL—See Mineral-Burning Oil.

ASYLUMS—Hazards of manual-training class rooms, work shops, weaving raffia and dyeing same with aniline or benzine-thinned colors, carpet weaving. See Alms Houses.

"ATE"—Chemical termination applied to salts of acids ending in -ic.

ATOM—An indivisible particle. The smallest portion into which an elemental substance can be divided. Made up of electrons.

ATTICS—In frame rows, where attics or roof spaces communicate, fires travel quickly from one building through the entire row. See Roof Space, also Frame Rows.

ATTRITION MACHINES—Is a hazard often found in rice mills. It consists of two metal discs revolving vertically, *turning in opposite directions* and separated by a slight space

(¼ inch) with slightly indented surfaces to give a grinding surface, and enclosed in a metal case giving the appearance of a blower. They are high speed machines, revolving at 1,500 or more revolutions per minute. Magnets should be placed in feed pipes, bearings provided with oilers and kept free of dirt.

AUCTION STOCKS are of varying description, from diamonds and precious stones to second-hand clothing and furniture. In the latter class, the premises are usually crowded, untidy and have work shops for repairing and refinishing goods. As a class, are not desirable.

AUTHORIZATIONS—Fire insurance companies have underwriters or examiners to make authorizations on the risks which they assume. Authorizations usually read so much on building and so much on contents. Say an authorization is $125,000 on building or $75,000 on contents, or three-fifths as much contents as building, being five-thirds as much building as contents. In other words, if the line is $125,000 and a $25,000 policy is written, the company is still open for $100,000 line on building, or three-fifths as much on the contents, $60,000. See Reinsurance.

AUTOCLAVE—See Aniline Dyes.

AUTOGENOUS WELDING—Acetylene gas, blau gas or hydrogen used. Two cylinders of 250 cubic feet of compressed combustible gas or one day's supply permitted. Reserve cylinders of gas should be kept outside of building some distance away. If inside, to be in vault of 8 inches of brickwork or 4 inches of concrete, with approved fire door, and ventilated to outer air. The National Board permits, at one time, five cylinders to be kept, if necessary, in a double-walled metal closet, ventilated, with fire door equivalent to walls of the closet. See Blow Pipe, also Oxy-Acetylene Welding.

AUTOMAT—See Embroideries.

AUTOMATIC DAMPERS—Are used principally on pipes or ducts conveying heated or cold air, or on pipes conveying shavings to boilers for fuel. All dampers should be of material slightly heavier than the pipe or duct, close fitting but not binding, and equipped with fusible link to operate

automatically thus preventing flames or smoke from gaining access to other parts of the building through the pipe or duct.

AUTOMATIC DOOR OR WINDOW—One which closes automatically by means of a device operated by heat.

AUTOMATIC FIRE DOOR RELEASE—In the near future it is expected that the N. F. P. A. will require an automatic door release in place of the present fusible links in almost all cases. After exhaustive tests as to the relative efficiency of the fusible links and a fire-door release, the N. F. P. A. says:

"The rate of temperature rise device is very much more sensitive to fire than the fusible link, and under the same fire conditions will operate and release fire-doors far in advance of the fusible link.

"In the tests made, the rate of temperature rise device operated in all cases in sufficient time to permit the doors to close before there was any danger of fire passing through the wall opening, while in only one case was it clear that this was accomplished by a fusible link, and in this case the margin of safety was slight. In two cases the fusible links failed to operate, although the rate of temperature rise device operated in 34 seconds and in 1 minute and 15 seconds, respectively, in these tests.

"In the first and second tests, the rate of temperature rise device operated in approximately one-third of the time required for the most sensitive fusible links, and in about one-fourth of the time required for the least sensitive of the fusible links.

"In the third and fourth tests, the rate of temperature rise device operated and the fusible links failed to operate.

"The tests indicate that under average normal conditions in fairly still air an approved form of rate of temperature rise device will probably operate in less than one minute when exposed to reasonably small freely burning fires several feet distant, and that 1½ minutes is a safe limit of performance under such conditions. The tests also indicate that about double this, or 3 minutes, is a reasonable limitation *for fusible links* under the conditions mentioned."

"The release is an approved device of a pneumatic compensating type, the mechanism consisting of one or more air chambers, a system of levers and a diaphragm mounted in a metal case. The release operates when the rate of temperature increase is abnormal, as in fire conditions, or at the rate of 15 degrees or more a minute. The device will release a fire-door from an incipient fire 25 feet distant.

AUTOMATIC SPRINKLERS—See Sprinklers.

AUTOMOBILE BODY BUILDERS may use converted wagon builders or wheelwright shops. Hazards of wood and metal working include oily floors, varnish and paint hazard, celluloid for windshields, upholstering, picker for hair, gasoline in tanks of cars, gasoline for cleaning grease from parts which are to be painted. A poor fire record class.

AUTOMOBILE FIRES originating about the engine from back-fires, short circuits of electric wiring, overheated breaks, gasoline on fire in carburetor, etc., are hard to extinguish. A quantity of oil on the engine or in drip pan feeds the fire. Water is of little value. Sand or dirt thrown on fire is better, but a carbon-tetrachloride (base) extinguisher is best. See Back-fires in Automobiles, Gasoline Spray for Automobiles, also Oxygen Cleaning Process.

AUTOMOBILE TIRES—Many, when shipped from the factory, are wrapped in a paper, the inner side of which has been treated with a water-proof solution. When the paper is wet, the asphaltum composition adheres to the tire. Unless it can be thoroughly removed with benzine, the tires are classed as seconds. All tire stocks should be placed on skids.

AVERAGE OR CO-INSURANCE CLAUSE—The 80 per cent clause is an "equalizer." It equalizes the payment for indemnity and cost of same among property owners by compelling the insured to become a co-insurer (as an individual insurance company), when he fails to maintain the proper percentage of insurance to value. It does not mean that a company pays only 80 per cent of the amount of loss, but it does mean that where there is a deficiency of insurance, payment is made only in the ratio that the insurance bears to 80 per cent of the actual or cash value of the property covered. *The clause is inoperative* when: 1—The conditions

have been fulfilled; 2—When the insurance exceeds 80 per cent of value; 3—When loss exceeds 80 per cent of value; 4—In case of total loss.

In case of total loss, the insured automatically becomes a co-insurer when his insurance is less than the value of the property. He can collect only the face value of his policies and must stand the balance of the loss himself. When the loss exceeds 80 per cent of value, the company pays policy in full.

The average clause was established for the purpose of forming a uniform basis of value upon which rates could be fixed without unfair discrimination against either the insurance company or the insured. It has been demonstrated that values would not be insured above 50 per cent were it not for the co-insurance clause, as the average loss seldom exceeds that figure and the companies would thus be deprived of an equal proportion of premiums. Low rates are due to superior construction and fire protection and consequently more salvage is expected in case of fire. The insured profits by the lower rate and the average clause. Furthermore, poor risks are usually fully insured and losses on such property are paid from premiums derived from good risks. It is evident that co-insurance is applicable only in case of partial loss, so that a property salvage will result in an insurance salvage. Also, from the side of the insured, the justice of the average clause may be explained thus: Two buildings of $10,000 each are erected side by side. One owner decides to insure for $2,500 at the rate of 1 per cent and pays a premium of $25 with no co-insurance required. His neighbor insures for $5,000, at rate of 1 per cent, and pays $50 premium with no co-insurance. Fire occurs and damages each building to the extent of $2,500, which amount each owner collects. The person carrying the larger policy has been discriminated against, as his neighbor collects 100 per cent of insurance to his 50 per cent.

The 80 per cent clause is used where the actual or sound value fluctuates; the 100 per cent clause where the owner *always knows the value* of the property.

Example, showing inequality of premium income and loss payment, with and without co-insurance:

Value	Ins. carried	Rate	Premium	Co-insurance	Ins. required	Loss	Co. pays
$10000	$2000	1%	$20	none	.....	$2000	$2000
10000	5000	1%	50	80%	$8000	2000	1250

Example—80 per cent. co-insurance clause:

Value of property	Ins. required	Ins. carried	Deficiency	Loss	Co. pays
$10000	$8000	$6000	$2000	$4000	$3000 or 6/8ths or the percentage that the amount of insurance carried bears to the amount that should have been carried.
					Assured's proportion $1000 or 2/8ths

Example—80 per cent. clause when loss exceeds 80 per cent. of value:

Value of property	Ins. required	Ins. carried	Deficiency	Loss	Co. pays
$10000	$8000	$6000	$2000	$8500	$6000

See Appraisals; see Adjustments.

100 Per Cent. Clause—Means that the insured agrees to carry insurance equal to the full value of the property covered. Similar to purchasing commodities, the company allows a reduction of 10 per cent in the rate where the clause is attached to policies as an incentive to buy more insurance. The benefit to the assured also lies in the fact that he can carry 20 per cent more insurance with but 12½ per cent more premium outlay by virtue of the 10 per cent rate reduction. Thus:

Property value	Co-insurance	Ins. required	Rate	Premium
$5000	80%	$4000	1%	$40.00
5000	100%	5000	1%—10	45.00

Example—100 per cent. co-insurance clause:

Value of property	Ins. required	Ins. carried	Deficiency	Loss	Co. pays
$10000	$10000	$8000	$2000	$5000	$4000 or 8/10ths or the percentage that the amount of insurance carried bears to the amount that should have been carried.
					Assured stands balance or $1000 or 2/10ths

AVERAGE RATES—See Blanket Policies.

AVERAGE RISK—The basis of all insurance, fire, life, *marine, etc., is based* on the law of average. In fire under-

writing, the "line" is based on the average inherent physical condition and hazards of each class of risk. A risk below average is one wherein the conditions surrounding it inject hazards or conditions not found in the ordinary risk, and is above average when the fire hazard is lessened by the absence of any substance, process, etc., which may be classed as one of the inherent hazards of the class. See Line.

AWNING MANUFACTURING—Cutting, sewing, pipe cutting, threading, and painting are practically the only hazards. Fair insurance risks.

AWNINGS—It is desirable, from a company's standpoint, to leave this item out of the building form, as many fires are caused by cigarettes and matches carelessly thrown from windows onto the awnings. Forms usually limit the amount of coverage to a nominal sum.

AXLE BOX—See Journal Box.

AXLE GREASE—Made from a mixture of heavy mineral oil with soaps made from the saponification of rosin oil, oleic acid, stearic acid with an alkaline metal and carbonate of soda. Cheap grades made of grease graphite and heavy petroleum oils. No boiling is required. Hazards are steam-heated kettles, storage of grease and oily condition of premises.

AZOBENZENE obtained from nitrobenzene and sodium-stannite, volatile and slightly inflammable. Manufacturing is a very hazardous process. Flash point 150°-200° F.

AZOBENZIDE—See Azobenzene.

AZOBENZOL—See Azobenzene.

AZOIMIDE—Explosive when dissolved in water.

AZOLETE is a mineral fibre.

AZOTIC ACID is nitric acid.

AZOTINE—A richly nitrogenous product, soluble in water, obtained by treating, with superheated steam, fabrics containing wool and cotton. Used as a fertilizer.

AZOXYBENZENE is a nitrobenzene derivative.

A1 METAL POLISH classed as benzine because flash point is below 100° F.

B

BABBITT OR BABBITT METAL—A soft antifriction metal composed of tin, copper and antimony. Used for bearings.

BABY CARRIAGES—Hazards include metal and woodworking. The metal parts are japanned or painted. The wood or willow parts are enamelled or painted. Enamelling, japanning or painting is usually done by dip process which is hazardous. Upholstery hazard is present when cushions are made. Fire record is poor.

BACKING—The rough masonry of a wall which has been faced with finer work.

BACK DRAUGHTS—The phenomenon of "back draughts" is the dread of fire fighters, for they never know at what moment they may be caught by one of these outbursts of flame. A "back draught" is really an explosion. When there is not a sufficient supply of air to produce complete combustion, the combustible will give off, in addition to the products of combustion, a gas which is combustible. This gas, when mixed with air, becomes either a combustible or an explosive, according to the mixture. When the adjustment of air and gas is a proper one, the resultant explosion is severe enough to wreck the building. Such a "back draught" is usually accompanied by a burst of flame.

BACK-FIRES IN GASOLINE ENGINES are caused by the improper "timing" of the gasoline engine and by improper adjustment of carburetor. A flame, varying in length, shoots from the air suction of the carburetor. The distance of the air suction pipe from the floor and from oil and waste depends upon the size of the machine and whether it is of horizontal or vertical type. See Gasoline Engines, also Automobile Fires.

BACK-PLASTERING—An extra coating of rough brown

plaster on lath between the outer sheathing and the inner or finish plaster, thus securing two air spaces.

BAD FIRE RISKS—Nice big farmhouses from which the family have moved to town, leaving them as camps for hired men, without watchful wives and mothers to smell smoke and care for stoves, lamps and candles. The hired men are careless, absent most of the time, and fire occurs.

Unoccupied dwellings outside of the police protection of cities or towns, slept in once in a while by caretakers, which, by the way, is not dwelling occupancy unless approved by the agent. They are open to tramps, subject to carelessness of boys and like the family-deserted farm dwelling, are hazardous risks.

Ex-factory buildings that may have cost thousands of dollars, but which, with their machinery removed, have been purchased for a few hundred dollars and converted into barns and warehouses. Such buildings are liable to be overvalued and insured for more than they are worth.

Stocks of merchandise purchased at assignee's sale for 65-cents-on-the-dollar invoice, and insured at 85-cents-on-the-dollar invoice, because the insured got a bargain. Careful consideration of the property as to present cash value from an insurance point of view is necessary.

Long distance over the hills and far away from the agency risks, on which the commission will not pay the agent for surveying them, and the amount of premium will not warrant the expense of the special for inspecting them. When insured "unsight, unseen," as boys swap pocket knives they are often sold (by fire) in a manner that causes the local agent to think the company carrying the business may also have been sold.

Property that has outlived its usefulness, that is unoccupied, that is not adapted for the purpose for which it was intended, that is overvalued, that is offered at forced sale, or that is at a distance from the agency, should be avoided; or, if written after full knowledge of the facts pertaining to it have been obtained, the amount of insurance thereon should be *based upon commercial* cash values, instead of upon the

cost of replacement, and rates should be made to cover the hazard.

In betting $1,000 under a policy of insurance against $7.50 premium or any other amounts, unsatisfactory losses can often be avoided by keeping an eye on the possible amount of loss instead of on the small amount of premium. It is also an excellent plan in such cases to carefully examine the other fellow's stake before accepting the bet.

Losses under the conditions stated are not necessarily criminal; they can arise from legitimate carelessness that would not occur if the insurance was 70 or 75 per cent of the commercial value instead of the commercial value being less than 75 per cent of the insurance.

Caused by New Conditions—It is freely admitted that three of the most unprofitable classes now being written are moving picture theatres, garages and hotels. To this might be added cotton oil mills, though the latter as a class are not proving as objectionable as the first three. The reason the movies are solidly set down on the black list is because the business has been seriously shaken up by the disinclination of people in these hard times to pay the increased admission prices demanded by the theatre owners on account of the high figures charged them by the picture producers.

Garages burn because men who were in the habit of maintaining three and four cars now worry along with one, or none. Hotels, particularly road houses, are anathematized by the fire underwriters on account of the numerous losses in that class resultant from the falling off of patronage that has followed the wake of the prohibition wave and the more or less general attitude that it is unfashionable to drink.

A cocktail at forty cents loses much of its subtle appeal. Saloons, however, are not burning. This is because, as a rule, they are located in mercantile buildings and can be readily re-equipped for other business purposes and because the saloon men prefer to sell their stock rather than burn it. Cotton oil mills present a moral hazard on account of the restriction in the cotton seed market entailed, in part, by the *quarantine* against cotton seed from Texas, where the boll *weevil is again busy*. This is especially true of use and occu-

pancy lines. Mills that cannot get cotton seed are frequently burning. In other cases where cotton seed is obtainable in only scant quantities, peanuts are being crushed instead, and the velvet bean is being used for the production of an excellent oil and for cattle feed. Copra from the South Seas is also being crushed in cotton seed mills in order to get cocoanut oil, which is used in the manufacture of such commodities as nut butter. In a word, conditions peculiar to the hour are altering substantially some of the well-established classes and bringing them under the disapproval of the underwriter. (Fireman's Fund Record.) See Moral Hazard.

BAFFLE PLATE—A metal shield placed midway between the burners of a gas stove and the stand on which it rests. Baffles are used in some forms of condensers to "baffle" the gas or liquid during a distillation process. There are other similar usages.

BAGASSE is the outside covering of the sugar stalk and contains practically no sugar, and is therefore used for fuel to operate the grinders.

BAGGING FACTORIES are of different classes—those making cotton duck bags, those making fibre bags, and those re-making used or second hand bags. In the first group, the hazard is principally cutting and sewing, and perhaps bleaching. In the second class, the hazards are fibre weaving, dusting, cleaning, sewing. The dusting and weaving produce considerable fine lint and machinery is apt to be coated with it. Good ventilation is necessary. In second hand bag mills, old bags of all kinds are remade. They are washed, dried, sorted, patched and sometimes re-woven. There is a certain amount of refuse, rags, etc., received in the used bags which should be immediately disposed of. Dry rooms should be standard. Premises usually present an unattractive appearance. Incidental hazards are waterproofing or fireproofing bagging. Fibre bagging factories have a poor fire record. Fires in this class produce considerable smoke and are liable to smolder for several weeks.

BAKELITE—Trade name of a synthetic substance, *Oxy-benzyl-methylen-glycolanhydride.* It is a condensation

product of carbolic acid and formaldehyde. Used principally for electrical insulation.

BAKERIES—In order of their hazards—pie, cake, bread, biscuit, cracker, and commission. Considerable grease is used in pie and cake bakeries, hence the additional hazard. Commission bakers buy and sell but do no baking. The small bakery is, as a rule, a more serious fire menace than the large one. In large establishments more attention is given to up-keep and care. Brick ovens (wood, coal or gas heated), unless built under sidewalk or under fireproof ceiling, should have plenty of space between top of oven and flooring or roof above, and set on concrete or earth base. No wood or refuse of any kind should be allowed on top of or near oven. Chimney should conform to Underwriters' rules. Setting of confectioner's stove important. Gas plate for heating grease for pans, and wood or metal closet in which is set a gas stove for "proofing" cakes, are often found.

Hot crackers taken directly from ovens, and closely piled and covered in packing rooms may generate enough heat or contain hidden sparks which will set fire to the pile.

Portable gas heated ovens, as now installed, are usually well arranged, but may be set too near combustible partitions. The floor protection should be the same as for large coal ranges or furnaces. See Matzoth Bakery.

BAKERS' SUPPLY DEALERS—Stock consists of baking soda, lard, spices, sugar, jellies, shortening greases, flour, pie fillings, machinery, pans and moulds used by bakers. Work consists of making pie fillings and jellies, using essential oils, cologne spirits, sesame oil, olive oil. Usual hazards are bottling of extracts, heating of kettles and bottling cotton-seed oil. A quick burner.

BAKING POWDER—Made of starch, phosphate of soda, cream of tartar, and bicarbonate of soda. Alum is used in some powders. In manufacturing, hazards are sifting, mixing, grinding, dust, drying, paper or wood box-making, and label printing.

BALATA—A species of gutta-percha.

BALED MATERIAL such as cotton, oakum, wool, hemp, *etc., when on fire should* never be opened inside of a build-

ing. It should first be "wet down" and then removed to the street. Opening of a single bale when on fire will often spread the fire to other bales, or the increased smoke further handicap the fire fighters.

BALK—A large beam of lumber.

BALL-COCK—A cistern valve at one end of lever, at the other end of which there is a floating ball. The ball rises and falls with the water in the cistern and thus opens and shuts the valve.

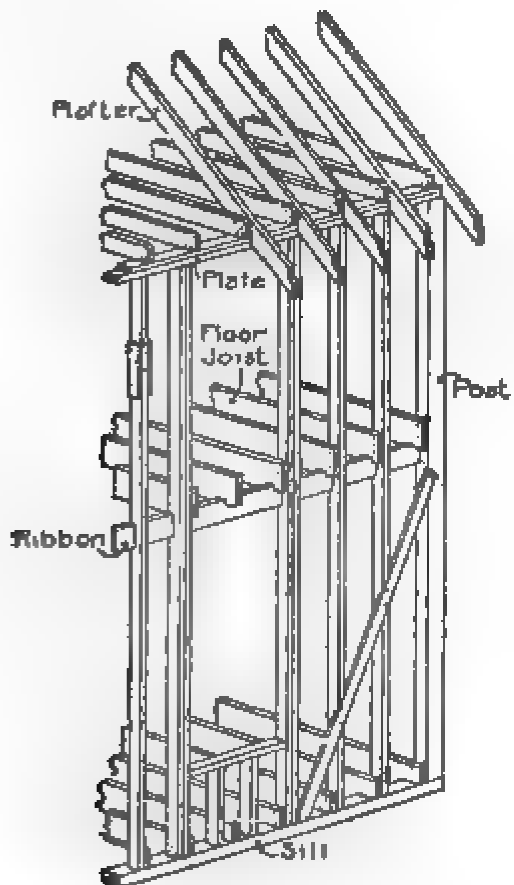
BALL MILL—A round iron drum, with open or closed top, set on an inclined axis, and operated by power. Used for coating pills, or grinding by means of iron balls placed in the mill which reduce the material placed therein to a finer state; also used for polishing metals by using sawdust, sand, etc. Those used in color works are about 4 feet in diameter and 2 feet deep and revolve slowly.

BALLOON FRAME—One of the poorest methods of construction. The frame work is of light material, neither mortised nor tenoned, continuous spaces between studs from cellar to garret which act as flues for a fire. "In this construction, the studs as well as the corner posts are carried from the sills (i. e., the flat timber which lies along the top of the foundation wall) continuously to the wall plate (usually called plate) at the top of the wall, and the floor beams of the second and third stories are carried by pieces, two by six inches, called "ribbons," spiked securely to the studs. They are stronger if let into the posts or studs. This type of construction costs somewhat less than the braced frame. If well braced with long struts and interties, are strong enough for all practical purposes; in fact it forms a rigid structure." (How to Build a Home.) See Braced Frame.

BALSA (or balsam)—A South American tree having wood resembling cork.

Fireproofing Balsam Wood—The wood is thoroughly dried in kilns at about 175° F., then placed in steam-heated cylinder where a vacuum is created. Sulphate of ammonia or phosphate of ammonia is then forced into the cylinder at about 100 lbs. pressure. Under this pressure the chemicals are forced into the wood. It is again dried at about 125° F.

BALSAMS—Aromatic liquid, resinous compound ing from trees or shrubs and consisting of a resin mi a volatile oil. Sometimes contains cinnamic or benz Also a medicinal preparation. Storage should always fined to the lowest floor of a building. Are quite in ble and have low melting points.



BALLOON FRAME

BANANA OIL—Prepared by acting upon amyl with acetate of lime and sulphuric acid, and distillin

BANANA RIPENING risks. Usually occupy lo basements. Hazards consist of an abundance of s salt hay, and gas radiators with rubber tubes set am combustible material. Poor fire risks.

BANDALA—A fibre from the hemp plant.

BANK VAULTS or record vaults. The nature tents requires massive construction to resist fire, b *building collapse or* explosion. Ceiling to be 4 inches

than walls, which should be built with air space between inner and outer wall. Doors, usually an outer and inner door with a sort of entry between which forms an air space. Doors should be steel, lined with 6 inches of concrete where in pairs, or 16 inches thick where single. All material should be on skids or shelves, and sills raised to prevent water damage. See Vaults.

BARBER SHOPS conducted by natives of southern Europe have shown a surprisingly high loss ratio. The equipment is subjected to considerable wear and tear, and there is considerable incentive to sell old fixtures (especially if upholstered and out of date) to insurance companies. The new enamelled fixtures are usually bought on installments. As attractiveness is a valuable stock in trade, it is best to decline unattractive shops. Few companies care for this class.

BARBER SUPPLIES—Stock consists of perfumes, cosmetics, soaps, brushes, cups. Soap making in a small way, making and bottling perfumes. Use alcohol, essential oils, vegetable oils and compounds of the same. Direct heat may be used in heating oils or emulsions. Fire records show many fires in this class.

BAR FIXTURE MANUFACTURING—See Cabinet Factories.

BARGE BOARDS—Boards nailed against the outer surface of a wall along the slopes of a gable end of a house to hide the rafters and to make a neat appearing job.

BARILLA—An impure carbonate of lime, used in bleaching.

BARIUM CHLORATE—A salt of chloric acid. At ordinary temperatures is not hazardous. See Chlorate.

BARIUM NITRATE consists of a heavy white crystalline-salt. Classed as not dangerous, but combustible when mixed with carbonaceous bodies.

BARIUM PEROXIDE, barium dioxide. Noncombustible alone, but when mixed with organic matter is dangerously inflammable.

BARK, the exterior covering of the trunk and branches of a tree. If piled near tannery or mill the hazard is prac-

tically that of the factory. If near railroad, the piles are liable to be set on fire by sparks from locomotives.

BARK DUST—Fires in bark dust are practically impossible to extinguish.

BARLEY in bags is said to be subject to spontaneous combustion.

BARREL (EMPTY) STOCKS—Underwriters should write this class with caution. There have been more than one fire of unexplained origin on the barrel dealers' premises, as many barrels formerly contained oils, acids, chemicals, etc. Where barrels formerly contained chlorate of potash there is danger from spontaneous combustion on account of the wood being impregnated with this substance.

BARREL STORAGE and re-coopering shops. Barrels, empty or containing a small amount of alcohol, high proof liquors, gasoline or benzine if left in yard where the rays of the sun strike them will vaporize and cause fire if artificial light is brought in contact with the bung hole. The height of piles and spacing are important. Usually frame construction. Barrel heater important hazard. Also painting heads of barrels with benzine-thinned paint. A poor class. See Cooperages.

BARU—A fine woolly substance from leaves of sage palms.

BARYTA POWDER—A blasting powder composed of charcoal and nitrate of baryta. Has a strong affinity for water.

BASE—A substance capable of combining with and thereby neutralizing or counteracting acids.

BASEMENT SHOPS—Where work is of a manufacturing nature it is not, as a general rule, considered a desirable risk. The lack of floor space brings about untidiness and makeshift heating devices. Swinging gas brackets are frequently found. Fires in this class are very numerous.

BASIC COLORS—Are known as sulphur colors.

BAST—Made from the fibre bark of lime trees, used for wrapping packages. Liable to ignite spontaneously if in contact with oils.

BATCH WARMERS—See Candy Factories.

BATH HOUSES—Those located at seashore resorts usually are of light frame construction and large area. Unsafe gas brackets and temporary heating apparatus may be found. As they are only "season" risks, considerable rubbish is liable to collect in open space under the flooring. Watchmen in winter time liable to force the coal stove and cause overheating of smoke pipe or stove. Cigarettes falling through cracks or space between floor boards is a common occurrence. The fire risk is considered poor.

BATING—A chemical process for removing lime from hides.

BATTEN DOORS—See Fire Doors.

BATTENS, pieces of boards or scantling a few inches wide, used to hold together several pieces running lengthwise.

BATTER—The sloping backward of a face of masonry.

BATTERIES—A device for converting chemical energy into electrical energy, and so constructed that the electrical energy may be used for industrial purposes.

Batteries, Dry—The essential parts consist of a zinc container which serves as the negative electrode, a stick of carbon which serves as the positive electrode, and a mixture consisting of fine carbon or graphite, manganese ore and sal ammoniac. This mixture is moistened with a solution of zinc chloride. A paper lining separates the mixture from the zinc container. After the mixture is packed in the container, it is sealed with pitch, or in some cases with a rosin seal. The pitch is heated by direct gas heat, and the vapor given off by the melted pitch or rosin is somewhat inflammable. The pitch kettles should be ventilated to the outer air. The zinc shell or container is japanned, painted with a benzol-pitch paint or coated with paraffin.

In storing the finished batteries care should be exercised not to bring the terminals of the batteries in contact with each other or any other metallic substance as the spark thus produced may ignite any inflammable material nearby.

Batteries, Lead Storage—The essential parts are the positive plates, consisting of lead oxide, and the negative plates, consisting of spongy lead. These are enclosed in a case of hard rubber or a composition rubber. Surrounding the plates

is a sulphuric acid solution of specific gravity of 1.3. In the portable storage battery, generally 3 or more of these single cells are united and sealed with an asphalt seal. The individual cells are capped, but a small vent is provided in the caps. In charging or recharging these batteries, care must be exercised not to recharge them too much, as this tends to electrolyze the sulphuric acid liberating hydrogen gas which is hazardous.

Edison Type Battery—In this the positive electrode is an oxide of iron, and the negative electrode a nickel hydroxide. These electrodes are surrounded by a solution of caustic potash, containing a small amount of lithium hydroxide. The container is a composition case. In charging, the same hazards apply as to lead batteries.

BATTERY OF BOILERS—A group of boilers delivering steam into a main pipe.

BATTING DROSS consists of fibre and resin formed by filtration of melted resin through raw cotton. Not subject to spontaneous combustion. Not classed as inflammable.

BAUXITE—A compound of aluminum.

BAY CONSTRUCTION is the term used to denote the absence of the ordinary small-sized beams in floor construction and is the space representing the span between rows of parallel beams or girders. Bays are sometimes panels, sometimes spans. In mill construction a bay is the distance between posts.

BEAM—Iron, wood, or other suitable material. Usually rests on girders at right angles, or on posts. Used to support floor loads or roof.

BEANS, if wet, and left in bags, will mildew and may be confiscated by Health Department.

BEARING—The points of support of a beam, shaft, axle. The "rest" or the block on which or against which a journal turns. See Friction.

BEARING WALL—A wall which supports floor or roof beams or girders.

BEDDING FACTORIES—A poor fire record class. See *Mattress Factories,* also Upholsterers.

BED MOULDINGS, ornamental mouldings on the lower face of a projecting cornice.

BED PLATE—A large plate of iron laid as a foundation for something to rest on.

BEDSPRING MANUFACTURING—Metal-working hazard with dip process painting, lacquering or bronzing. Excelsior is used for packing. A very poor fire record class.

BEES-WAX—A solid wax of which the cells of the honey comb are made. Melting-point, 143-147 deg. F.

BEET VARNISH—Made from red beets soaked in spirits of wine.

BELLITE—An explosive compound which can only be exploded by a detonating cap.

BELL-METAL—Copper and tin melted together. See Bronze.

BELLY-ROD TRUSS—See Hog Chain Beam.

BELT BOXES, especially in cotton mills should be kept scrupulously clean. Often found filled with dust and flyings of cotton or wool, which covers everything not in rapid motion.

BELT HOLES should be boxed, i. e., enclosed at each floor to reduce floor opening to a minimum. See Boxing.

BELT MANUFACTURING—Many use a water-proof cement composed of acetone and rubber cement with celluloid and carbon bisulphide, or Viscol.

BELTING (COTTON)—Is made of woven cotton, and waterproofed. If the belting is left in water for a few hours the water will dissolve the dressing and render the belting worthless. After being wet, the belt will not run true on pulleys, hence is unsalable.

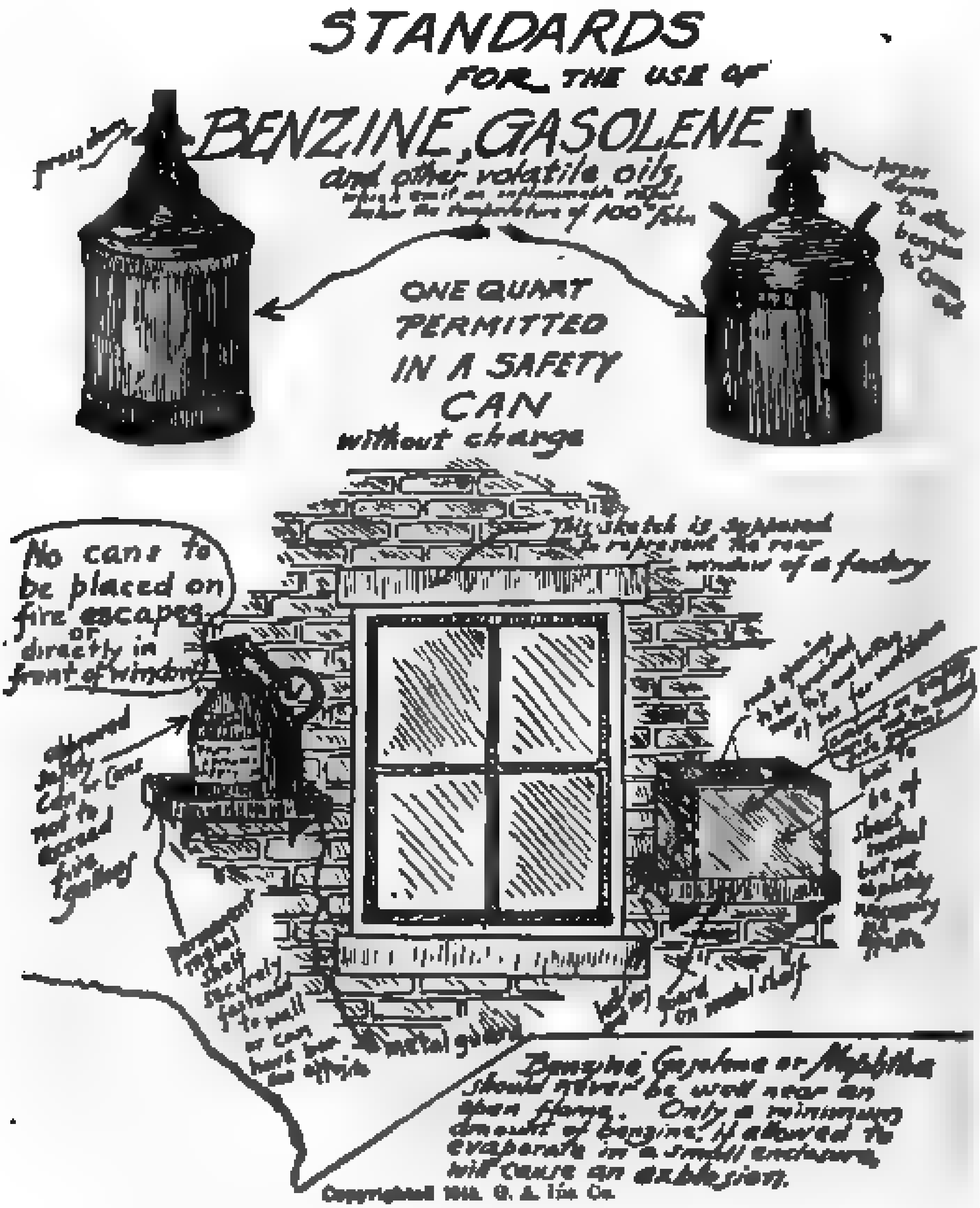
BENTINE SPIRITS, approved benzine substitute. Flashes at 103 deg. F.

BENZENE, obtained by fractional distillation from coal tar. Colorless, volatile, inflammable. Solvent for fats and gums. Derivatives used in medicines and dyestuffs. Same as benzole.

BENZALDEHYDE is called oil of bitter almonds.

BENZIDAM—Derived from nitro-benzole. Combustible.

BENZIDINE, *made from* nitro-benzene, alkali solution



and zinc dust. Similar to making sulphonic-acid. Used in dye-making.

BENZINE—Obtained by fractional distillation from petroleum. Colorless, inflammable, volatile, consisting of various hydro-carbons. Flash point from about 70 to 84 deg. F.

BENZINE SUBSTITUTES—See under Trade Names.

BENZOATE OF SODA—Toluol is brought to plant in *steel drums; glass* carboys are filled ¼ full and five or six

f them are placed in a circle with incandescent electric ights of considerable power in the centre. Chlorine gas is llowed to run through pipes to the bottom of carboys and s absorbed by the toluol. To this compound is added lime nd the product distilled in a steam still. Benzoldehyde is t first given off, and then benzoic acid, and filtered. Folowing this it is again distilled (sublimed) and made reaonably pure. The benzoic acid is mixed with carbonate of oda, giving benzoate of soda. (J. M. Donald.)

BENZOIC ACID—Obtained from resins. When strongly eated it burns in contact with air.

BENZOLE—Flash point 14 deg. F. Same as benzene. Should be stored only in steel drums.

BENZOLINE—Its vapors mixed with air are explosive.

BENZOL-TRINITRO, high explosive.

BENZOYL-CHLORIDE consists of a clear colorless iquid. Not combustible, not classed as inflammable.

BERENCO LACQUER is non-explosive. Alcohol is used s a thinner.

BESSEMER STEEL—Sometimes called Ingot Iron. Produced from cast iron by blowing air through it while in a nolten state. This process is repeated until all the carbon s removed. The required degree of carburization is produced by adding a proportion of iron containing a known percentage of carbon and manganese. The Basis Bessemer process, called acid Bessemer process, is one where the sulphur and phosphorus cannot be removed except by employng a converter lined with basic material in which other varieties of iron can be used. Bessemer steel can be produced in various degrees of hardness, but it cannot be tempered or hardened subsequently. It has a rather lower tensile strength than other mild steels. A Bessemer converter s a cylindrical iron vessel lined with a refractory material n which molten pig iron is submitted to the oxidizing action of a stream of air.

BESTO—A shoe filler, mixture of ground cork and gutta percha, resin and paraffin oil. Classed as non-inflammable.

BETANOL is castor oil.

BETTINI *MOVING-PICTURE* PLATE—Is made of or-

dinary glass in place of film. The picture is taken on and projected from this plate. It is developed by the ordinary photograph process. A special machine is used for projecting the pictures, the plates being placed in the camera and follow in order by operating the machine. Ordinary incandescent lamps or a special arc lamp is used in projecting the views.

BETON, sometimes called artificial stone. Made of hydraulic cement with broken stone, broken bricks, gravel, etc.

BEVEL-GEAR, cog-wheels with teeth so formed that the wheels can work into each other at an angle.

BEVELLED, or self-releasing, applied to timbers on masonry walls which have the bevelled end resting on the wall in such a manner that when the timber is ruptured it can fall out or release itself without tearing out part of the wall.

BICARBONATE OF SODA, commonly known as baking soda. Composed of one part each of sodium, hydrogen, and carbon and three parts of oxygen.

BICHLORIDE OF TIN—A crystalline solid. Not hazardous.

BICHROMATE OF POTASH—See Bichromate of Soda.

BICHROMATE OF SODA and bichromate of potash are yellow crystalline salts which act as oxidizing agents. Not considered hazardous in themselves.

BICYCLE AND MOTORCYCLE MANUFACTURING—Mainly a metal working hazard with foundry. Japanning and lacquering on a large scale usually by dip process. Also plating, wood rim making and varnishing, and leather saddle making. Poor risks unless hazards are cut off.

BICYCLE AND MOTORCYCLE repair shops—See Motorcycle Repair Shops.

BILGE BARREL—A metal drum made of steel.

BILL POSTERS—Often occupy poorly kept properties. Stables are apt to be in connection with such risks. Considerable waste paper abounds. Gas or coal heat used for making paste. Smoking by employees an important feature. *Not very attractive* class.

BILLS—Cannot be insured under the standard policy. See Uninsurable Property.

BINDER—A temporary contract between the insured and the insurer. Issued pending the issuance of a policy. On it is written the name of the insured, the description of property covered, location, mortgage, amount, term for which the policy is to be written, and rate. Issued for fifteen-day period as a rule and is renewable; cancelled in same manner as a policy. See Application for Insurance.

BINITROTOLUOL—A yellow crystalline solid (not explosive or dangerously inflammable). Resembles trinitoluol which is highly explosive.

BINOXIDE OF HYDROGEN—Colorless liquid of syrup consistency. From the readiness which it gives off its oxygen it is a powerful oxidizing agent. Same as peroxide of hydrogen.

BIRD AND ANIMAL STORES—Live animals and birds easily asphyxiated by smoke. Fixtures, furniture and stock of supplies, however, classed as good risks. Light repair shop work.

BIRD FLY MACHINE—A device for pasting the paper or linen fly-flaps inside of paper boxes.

BIRDS NESTS—Fires have been known to destroy church steeples by birds (pigeons) carrying oily waste material for their nests which latter causes spontaneous combustion.

BISULPHIDE OF CARBON—See Carbon Bisulphide.

BISULPHIDE OF IRON is iron pyrites.

BISULPHURET—Another name for bisulphide.

BITUMENS—All varieties of this mineral substance are very inflammable.

BITUMINOUS COAL—In storing bituminous coal no pile should exceed say 1,200 tons. Piles should be trimmed off and squared, and not exceed 12 feet in height, and, where more than one pile, a clear space of 5 or 10 feet should be maintained. Where possible coal which has been made wet by snow or ice should be disposed of or should be spread out to hurry drying by evaporation. Coal piles left standing for some time should be rod tested to discover heating.

BLACK DAMP *is choke* damp.

BLACK DYED GOODS are apt to cause spontaneous combustion.

BLACK JAPAN—A varnish made with tar and alcohol, or lamp-black and resins.

BLACK PAINT—A compound used by tanners. Contains pyroxylin or gun cotton dissolved in amyl acetate. Flash point 35 deg. F.

BLACK POWDER—Explosive consisting of 75 per cent saltpetre, 10 per cent sulphur, 15 per cent charcoal.

BLACK TOM EXPLOSION—See Explosion.

BLACKING—Made usually from powdered bone black, molasses, linseed oil, and oil of vitriol. A poor fire record class. See Shoe Polish.

BLACKSMITHS—Usually locate in buildings of inferior construction. Note setting of forges and anvils, tire furnaces and painting. See Anvils; also Forges.

BLANC FIX—Resembles white lead. It is the refuse in the manufacture of peroxide of hydrogen, a by-product of barium dioxide.

BLANK RATING. When the financial rating of a firm or individual does not appear in any of the mercantile rating books, it is usually a good tip to keep off the line. See Trade Reports; also Mercantile Reports.

BLANK WALL—A wall without openings.

BLANKET FORM—A form covering building, machinery and stock under one item.

BLANKET POLICIES may cover the buildings or contents of one, two or any number of buildings. If communicating, they can be written with the 80 per cent and distribution clauses; if not communicating, the 100 per cent clause must be used without any allowance for same. These policies must be written cautiously and the liability figured as though the entire amount covered in each building under a blanket form. See Schedule; also Distribution Clause.

BLANKET RATES—Cover two or more properties or subjects of insurance, as for instance one rate covering building, machinery and stock under one form.

BLAST FURNACES—Are of two types. The water-jacketed furnace and the long rectangular brick furnace, but

most modern blast furnaces are now of iron with water jacket. Water circulates in the jacket, thus preventing the fused charge from melting the iron at the sides. The brick furnaces are rapidly attacked by the fused charge.

Blast Furnace Gas—Produced by the combination of the blast with the fuel and minerals in the blast furnace. Combustible.

BLASTING CAPS consist of small hollow copper cylinders containing fulminate of mercury, or a mixture of fulminate of mercury and potassium chlorate. Very dangerous.

BLASTING GELATINE is a mixture of nitroglycerine and gun cotton. Powerful explosive.

BLASTING POWDER—An explosive much used by miners. It contains more sulphur than gunpowder.

BLAUGAS LIGHTING SYSTEM—This is a gas system for house lighting and heating, using liquefied hydrocarbon gas made from petroleum distillate. (Colorless, inflammable, and made by passing mineral oil into highly heated retorts, the oil being decomposed, forming a gaseous product.) The gas is stored under high pressure (900 pounds per square inch) in steel cylinders, and is expanded into the house piping through suitable reducing and regulating valves. The high-pressure cylinders, together with reducing and regulating valves, are contained in a locked and ventilated metal box.

The system is arranged to run automatically with small expansion tanks in this box, or non-automatically with larger expansion tanks which are buried or installed in well ventilated brick or concrete houses when near buildings.

The gas itself, after introduction into the house piping, embodies about the same hazards as ordinary city gas, but under somewhat higher pressure (about 12 inches water column). The apparatus is well constructed and is safeguarded as far as appears to be practicable at the present time. The high pressure apparatus is to be installed outside of buildings, well removed from all openings where escaping gas may enter or accumulate. (Board of Fire Underwriters.)

BLEACH, DYE AND PRINT WORKS—Raw stock includes cotton goods to be worked, acids, chlorate of potash, chlorate of soda, acetate of iron, tin oxalite, sodium sul-

phate, sumac, chloride of lime, bisulphide of soda, acetate of chrome, caustic soda, starch, aniline and logwood dyes, aniline oils and salts. Process, dyeing, drying, singeing, ageing, calendering, printing, etching and engraving rolls, folding and packing. Benzine is sometimes used as a mordant in calico printing.

The causes of fire are attributed to lighting, power, singeing, dye mixing, printing, steaming, ageing, napping, and spontaneous ignition of freshly-dyed goods.

A fire occurred in a pile of black dyed goods which were piled immediately after leaving dry room and while still warm. Poor fire record.

BLEACHED SHELLAC—See Shellac.

BLEACHING POWDER—A heavy white powder composed chiefly of calcium hypochlorite (known also as chloride of lime). It gives off chlorine gas when heated or mixed with acids. Not classed as inflammable. See Chloride of Lime.

BLEACHING ROOMS (sulphur) in hat factories should be constructed entirely of incombustible material as follows: The side walls and ceilings to be wire lath and plaster (preferably on iron supports). If, however, the room is wood enclosed, the same may be lined, including the ceiling, with plaster boards or similar equivalent construction at least ½-inch thick secured by roofing nails, the nail heads to be covered and all joints between the blocks filled in with asbestos cement. The floor to have a course of bricks laid in cement throughout and an additional similar course directly underneath the sulphur pot. When a vent pipe is used, the same is to be constructed of brick or terra cotta with a damper to be controlled from the outside of the room. Metallic substances should not be employed on account of corrosion. See Hats, Straw.

BLENDING—Also known as compounding, is mixing liquor to obtain a desired blend. No material hazard. See Liquors.

BLIND ATTIC—See Attic.

BLIND-NAILED—Used in fire door-making. Metal

nailed on doors and then metal bent over top of nail head. See illustration on Communication, page 143.

BLOCK LINES—Are the "lines" which in the aggregate represent the amount of liability which a company has on a city block of buildings. See Line.

BLOCKING PRESS—A gas or steam-heated press under pressure used in shaping hats.

BLOODED LIVESTOCK of fancy value should not be written until the company is in possession of all the facts of physical and moral hazard. Considerable value is wrapped up in a blooded animal. A slight accident will so depreciate an animal's worth that there may be incentive to destroy the animal by fire and collect the insurance. See Lightning Rods.

BLOW PIPES—Tubes through which air or gas is forced under pressure to intensify heat of a flame for jewelers', gas blowers', etc., use in manufacturing. Should only be used on iron table or table which is protected by sheet metal or asbestos.

BLOW TORCHES—Should be on incombustible stands. See Brazers.

BLOWER SYSTEMS for heating or ventilating consist of a number of galvanized iron ducts through which air is blown for heat, or from which impure or heated air is sucked for ventilation. In each system, the openings in the ducts are covered with wire screening. Motor-driven fans are usually employed. A clearance of one inch from combustible material is recommended, and ducts should not be connected to flues or stacks used for any other purposes; neither should they pierce fire walls unless an automatic drop door is installed where passing through. Where piercing floors, the ducts should be protected by 4-inch tile or its equivalent. The latter two features (piercing walls or floors) reduce the efficiency of the fire wall or floor, as fire, once entering the flue, travels the entire system unless stopped by standard automatic dampers or doors.

BLOWER SYSTEMS FOR CONVEYING STOCK—Present the hazard of causing, conveying and fanning a fire. The following should be observed to reduce these haz-

ards to the minimum. At the feed end hazardous machines, such as pickers, should never be connected direct. Feeding should be by hand. In sprinklered risks a sprinkler head should be placed in the feed end properly guarded. Blowers should be entirely of metal and have automatic dampers where passing through fire walls. Systems should be of the induction type so that stock does not pass through the thin blades of blower fan. See illustration, pages 80 and 81.

BLOWERS FOR REFUSE such as sawdust, shavings or buffing dust from buff wheels operate as noted. The ducts are cylindrical and have a hood which fits quite close to the machinery to allow a larger opening for the refuse to enter the duct or pipe. They are liable to breakage and disruption through carelessness or vibration, and therefore should be substantially constructed. The refuse is drawn through a cyclone or separator where the fine dust is allowed to free itself, the heavy material going to a vault or other receptacle. Dust from buff wheels and other light material should pass through a water sprayer or be deposited in a receptacle partly filled with water to keep down the percentage of dust. All blower systems should have suitable clean-out doors, fans and motor bearings easily accessible and be kept clean to prevent clogging and friction. Fires have been caused by exhaust apparatus becoming overheated. See Shavings Vaults, Buff Wheels; also Direct Feed to Boilers.

BLOWN OILS are made by oxidizing rape, cotton seed, linseed and lard oils. Used for lubricating purposes.

BLUE BILLY or pyrites cinder is a residue from burning pyrites in the manufacture of sulphuric acid.

BLUE PRINT PAPER is made by passing paper through a sensitizing solution composed of ferric ammonium, citrate and potassium ferri-cyanide. Not a hazardous process. **Blue Printing** is by exposing the sensitized paper to the light, either natural or artificial. Printing is sometimes done by machinery in which case arc lamps are used. Good insurance risks.

BLUE VITRIOL is sulphate of copper.

BLUING—Made from burnt umber, sulphur, soda, clay and a liquid adhesive resembling molasses.

BOARDING-HOUSES where meals are served are considered somewhat better fire risks than furnished room houses, because the change of patrons is not so frequent. Inspection should be made before line is written. See Furnished Rooms; also Lodging Houses.

BOAT CLUBS—See Boat Houses.

BOAT HOUSES—Usually light frame construction directly on the water front, remote from fire protection and inaccessible. These buildings may have kitchens, rooms containing paint, oils, oakum, gasoline, grease, mattresses and boat fittings. As a rule only occupied part of the year. Have no watchman, but sometimes have a caretaker living on the premises. During the idle season, dances are held occasionally. A very poor fire record class, avoided by most underwriters.

BOATS (sprinklers in)—See Sprinklers.

BOILED OIL is made by heating linseed oil. Used in paint, varnish and oilcloth manufacturing.

BOILER COMPOUNDS—Made of various substances. Dry powder boiler compounds may be made of caustic soda, quebracho (which resembles tar), and soda. It is used to remove scale from inside of boiler.

BOILER EXPLOSION—Does the Boiler or the Water Explode?

Water in an open kettle boils at 212 deg. F. The Fidelity and Casualty Bulletin says that when the surface of boiling water is subject to atmospheric pressure or zero gauge pressure, its temperature is 212 degrees F.

When the gauge pressure is 150 pounds per square inch the temperature of the water is 350 degrees F., and if all the inlets and outlets to the boiler be closed, the water will not boil, notwithstanding the fact that its temperature and pressure are many times greater than the temperature and pressure of boiling water.

If, however, a valve be opened, the water immediately begins to boil, even though the furnace heat has been shut off. But when all of the inlets and outlets are closed the highly-heated water in the boiler is in fact nothing more nor less *than liquefied steam* gas. It remains in the liquid

state by reason of the high pressure to which its surface is subjected.

If, however, suddenly there be made a large opening above the water level, as for example when a large steam pipe or header is ruptured, the pressure on the surface of the water being suddenly relieved permits the liquefied steam gas commonly thought of as hot water to violently explode in much the same manner as if it were nitroglycerine.

The result is commonly termed a boiler explosion. It is in fact an explosion of liquefied steam gas. That is to say, it is an explosion of a large body of water at high temperature. It is no wonder, then, that boiler explosions are often as disastrous as dynamite explosions.

BOILER SETTING—A small upright heating boiler has been known to set fire to woodwork under its 8-inch concrete base (laid without air space). All solid materials such as brick, concrete or asbestos have a comparatively high heat conductivity. Porous material such as terra-cotta tile or a liberal air space permitting a circulation of air is a better insulation against heat than solid matter. Dust and wood chips on top of boilers are certain to be ignited by radiated heat.

BOILER SMOKE PIPE against the under side of an 8-inch concrete floor arch has been known to ignite stock on the floor.

BOILERS, brick set, are those which are enclosed in brickwork covering the outside of the boiler, and usually having a concrete or brick top.

An **asbestos-clad boiler** is one which is wrapped in asbestos which is applied as a cement, about 2 to 4 inches in thickness.

Boilers, **portable.** All combustible floors and beams under and not less than 3 feet in front of and 1 foot on side of all portable boilers shall be protected by a brick foundation of two courses of brick. See Battery of Boilers; also Fire Tube Boiler.

For installation of temporary kerosene oil burners, see *Kerosene Burners.*

BOIS DURCI—Sort of wood block made of finely powdered sawdust worked up with blood and pressed in moulds.

BOLL WEEVIL—An insect pest whose annual ravages cause a loss of 400,000 bales of cotton in the South. The annual loss in Texas alone as a result of the weevil's depredations is placed at $2,700,000. Thus far the only successful means of control has been the burning of dead cotton stalks in the Fall, thereby destroying in a large measure the hibernating millions that would develop into active parasites during the coming season. These parasites have injected a moral hazard into cotton mills, as the small crop means less work and the corresponding shutting down of the plant. Plowing between the rows at the proper season and knocking off the punctured squares (the boll weevil during its early stage), and plowing them under is also very effective.

BOLSTER—A timber or a thick iron plate placed between the ends of a bridge and its seat on an abutment.

BOLTER—A power sifter or cleaner. Usually of rotary type.

BOLTING CLOTH (used in flour mills)—Is imported, of different meshes, and woven by hand. Very susceptible to damage by heat.

BOMBS—Consist of a metal shell containing explosives to which a fuse is attached. Whistling bombs contain potassium picrate.

BOND, the placing of brickwork or blocks of stone so as to form the whole into a firm structure by the judicious overlapping of each other so as to break joint.

BOND AND CAP STONES, especially if carrying heavy weights, should be insulated with concrete, terra cotta or brick 2 to 4 inches in thickness. Heat and the application of cold water under pressure cause the stones to crack and may cause the building to collapse.

BONDED WALL—See Bond.

BONDED WAREHOUSE—See Warehouse.

BONE BLACK—Made from the poorer grade of bones. Subject to combustion in the presence of moisture.

BONFIRES, especially in open city lots, have caused many losses *by flying brands and* grass fires.

BOOKBINDERS—Process consists of cutting, gluing, embossing, printing and binding paper. Hazards of glue pots, gas-heated embossing presses, paper scraps, printing presses. See Printing Hazards.

Marbling, a process of coloring. A large vat is filled with thin glue and nearby is a row of jars containing coloring matter of great variety. The marbler takes a brush from one jar after another, sprinkles successive colors on the surface of the glue, then with a rake or comb draws the colored surface into curious patterns. Holding a handful of books which have been folded and sewn and have their edges cut smooth, the marbler dips them into the vat and brings out on the exposed sides the pattern lying exposed on the surface of the vat.

Gilding—The design is first stamped or embossed upon the cover, thereupon the gold leaf is carefully placed over it and the whole is again placed in the embossing machine and the gilt stamped into the design. The fire record is good.

BOOKBINDERS' BOARD MANUFACTURING—The raw stock consists of paper, rags, wood pulp and fibre. The process is sorting, cutting, shaking and finishing. Machinery used are calenders (steam-heated), paper-making machines, steam dryers, rag cutters, beaters, boiling kettles. Crude oil is used to reduce foam in beaters. Similar to paper-making.

BOOKS—If new, offer good insurance; if old, the contrary. When piled on shelves, water damages the upper tier as a rule and fire burns the outer edge.

BOOKTILE—Tiling, wide, flat, thin and shaped like a book. Laid so that the convex end of one sets into the concave end of the next. Used in roof construction instead of heavy tile or concrete to lessen the weight.

BOOSTER HOUSE—Term applied to an electric transformer station.

BOOSTING—Dressing stone with a broad chisel called a "booster" and a mallet. The booster gives a smooth surface after the use of the "point," or other narrow chisel.

BOOT AND SHOE FACTORIES—See Shoe Factories.

BOOT BLACK AND HAT CLEANERS—Ownership largely a foreign element. Use sulphur for bleaching straw

hats, benzine for cleaning hats, gas-heated irons and blocking irons.

BOOT DRESSING—See Shoe Factories.

BORAX—A white crystalline compound used as an antiseptic, as a flux by glass and pottery workers, and for chemical processes. Susceptible to smoke and water damage.

BORE—The inner diameter of a hollow cylinder.

BORNEENE—An inflammable hydrocarbon.

BOTTLERS of soft drings with flavoring extract-making. Work consists of washing, labelling and filling bottles. Making flavoring from fruits and herbs and essential oils, using steam-heated kettles and confectioners' stoves. Hazards are boiler, excelsior for packing bottles for shipment, and sealing bottles with paraffine. See Mineral Waters.

BOTTLE-STOPPERS, called "crowns," are made of sheet metal stamped out and edges crimped, then lined with waxed paper and cork disk. The wax is a mixture of paraffine and rosin, heated by gas or steam. Paper usually waxed on the premises by drawing the paper strip through the melted wax. The machines used are automatic, rotating and gas-heated, and crimp, line and press the crown in one operation. Metal working hazard. Varnishing tops. The cork disks are bought ready-made for use. See Cork.

BOTTOM HEAT—A term sometimes used in connection with heat produced in dry rooms, hothouses, etc.

BOULINIKON, a kind of floor cloth like linoleum. Made from buffalo hide. Manufacturing process similar to linoleum-making.

BOWLING ALLEYS, if established and run by responsible people, are considered good insurance as practically no stock is carried. Use wax or floor mops for dressing floors. Basement alleys suffer greater damage than those above grade, as water will cause the alleys to warp, necessitating relaying.

BOX BOARD—The trade name for the pasteboard used in paper box making. Technically known as "Chip Board."

BOX-BOARD LINING manufacturing. The process consists of cutting the boards and running them through a press *similar in appearance to a* cylinder press which has a gravity *feed paste-pot attachment* which drops the paste into a

trough, and a reel of thin paper is automatically pasted on the cardboard. Used in place of paper boxes. Hazards similar to paper box making.

BOX GIRDER—A type of steel or wrought-iron girder having two vertical webs and a connecting flange at top and bottom.

BOXED STAIRS—See Stairs.

BOXING—Applied to belt openings when same are enclosed at floors to lessen the size of draft opening. Cornices are cut off for same reason. See Belt Holes.

BRACE-AND-INCLINED BEAM—A bar or strut for sustaining compression.

BRACED FRAME—Girts or beams carry the floor beams of the floors above the first, and are framed into the corner posts (which should extend to the wall plates), those supporting the end of the beams dropped to a secure level with the side girts (for this reason they are called drop girts). On these girts the studs of the outer walls and partitions are framed, so that each story has a separate set of studs. At all angles also there are angle braces tending to strengthen the structure. (How to Build a Home.) See Balloon Frame.

BRACKET CHIMNEY—A chimney which rests on a wall bracket instead of being built up from the ground. A poor and unsafe construction. An increased danger when bracket is of wood. See also Corbel and Wall Chimney.

BRAID AND DRESS TRIMMING MANUFACTURING—Hazards are storage of raw materials, dyeing, drying, braid and weave machines, winders and spoolers, sewing machines, gas-heated straw machines and crimpers, packing and labeling. See also Embroideries.

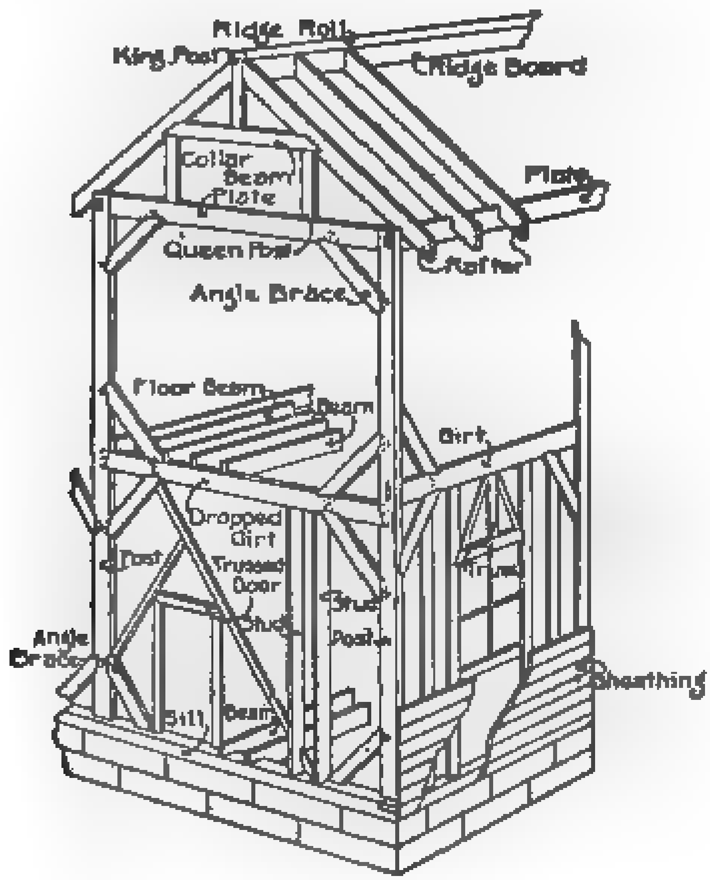
BRAKE—A long machine used by tinsmiths to bend the sheet metal into proper shape.

BRAMWELL FEED, an automatic attachment for feeding carding machines. It consists of a small pin for holding the stock which is picked up by a slowly moving apron and usually has a hood over the feed. The hoods should be removed or have a sprinkler head placed under the same. Some rating bureaus charge an extra rate for machines equipped with Bramwell weeds. See Carding Machines.

BRAN—Spontaneous combustion hazard similar to hay.

BRANCH OFFICE MANAGER—Unlike the insurance broker, he represents the Insurance Company and the latter is bound by and responsible for his acts.

BRANCH OFFICE RISK—Any risk permitted to be written by the Branch Offices, the class consisting of dwellings, stores and dwellings, and minimum rated stocks. In other words, this class, owing to the light character, need not be



Braced or Full Frame.

rated except for area or special conditions. Branch offices write only the so-called preferred business, and not manufacturing risks or special hazards. A school, except industrial schools in a building, does not remove risk from the Branch Office class. See Risk; also Minimum Rates.

BRANCH STORES—Sometimes goods are removed back and forth from main store to branches. Such stocks should be carefully investigated Fires have a habit of starting in branch *stores which* are filled with out-of-season or *shop-worn goods shipped* from main stores, especially if

located in another town. See Mercantile Reports; also Trade Reports.

BRANCHING—See Flowers and Feathers.

BRANDY—Made by distilling fermented fruit juices. Whiskey compounds are used as substitutes. Flash point about 90 degrees F. See Distilleries.

BRASS—Composed of copper and zinc.

BRASSIL—Another name for pyrites.

BRAZE—To unite pieces of iron, copper or brass by means of a hard solder called spelter solder. See Weld.

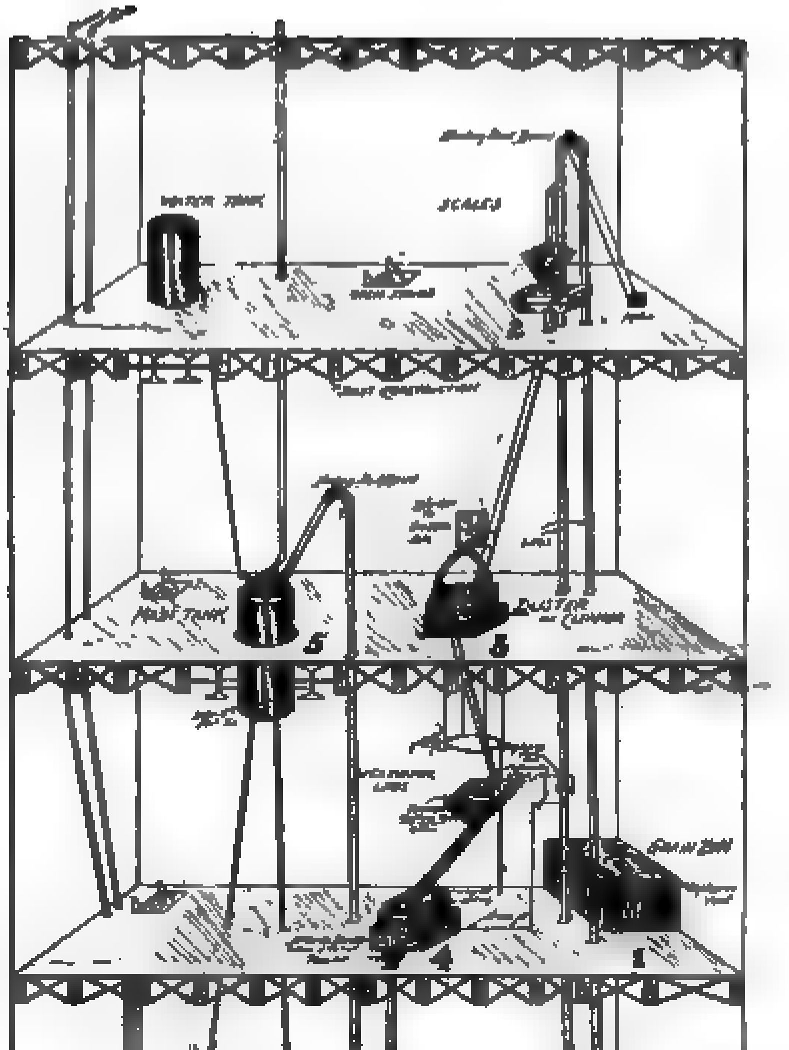
BRAZERS (or blow torches) used in metal-working establishments, consist of stout, flexible tubes, carrying gas from a supply pipe to a nozzle which is attached to another flexible pipe through which the operator directs a stream of compressed air. This stream of air serves the double purpose of intensifying the heat of the gas flame and blowing it with force against the metal surface to be worked. The brazer should rest on a solid iron bed or brick base. Rubber tubes are permitted; but gas shut-off cock should be located at permanent wall connection.

BREAK-JOINT—To so overlap pieces that the joints shall not occur at the same places, and thus prevent a poor bond.

BREAST-SUMMER—A kind of lintel supporting a wall over a door or other opening.

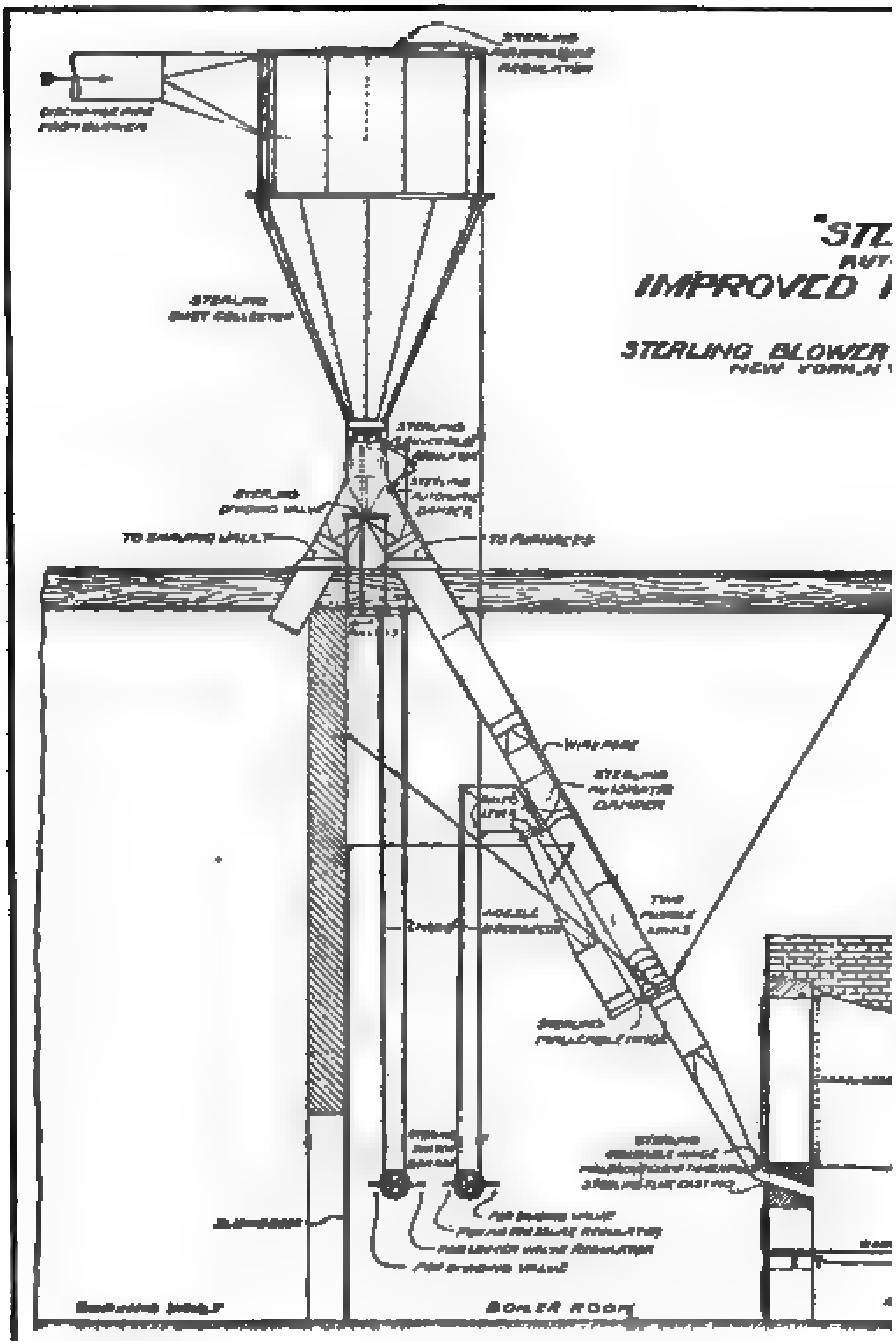
BREECHING—An iron flue, lined or unlined, or brick or tile, connecting the larger or header flue from the boiler to the stack. See Smoke Pipes.

BREWERIES—There were approximately 992 breweries in the United States on January 1, 1919. Lines on breweries should be written cautiously at this time on account of the Prohibition wave throughout the United States. Process is steeping or soaking grain in warm water, spreading same on "growing floor" to germinate or sprout the grain; dried in kilns, stored in bins, screened to remove dirt or waste, weighed, crushed in malt mill, mixed with water and other ingredients (and at times adulterants) in mashtub, cooking or brewing with hops in steam kettles (known as wort), the liquor drawn off and filtered or contents dumped into

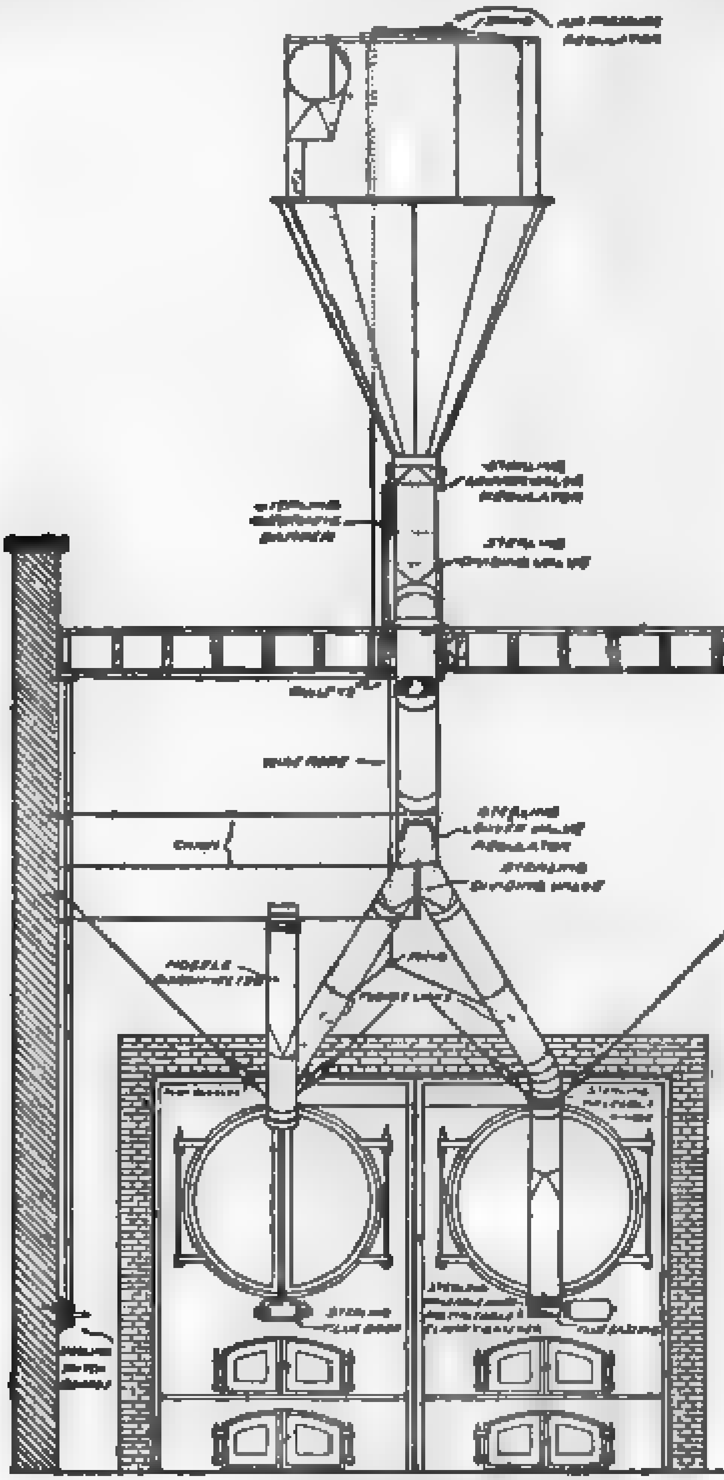


From "Live Articles on Special Hazards," pub. by "Weekly Underwriter."

Brew House.



SIDE ELEVATION

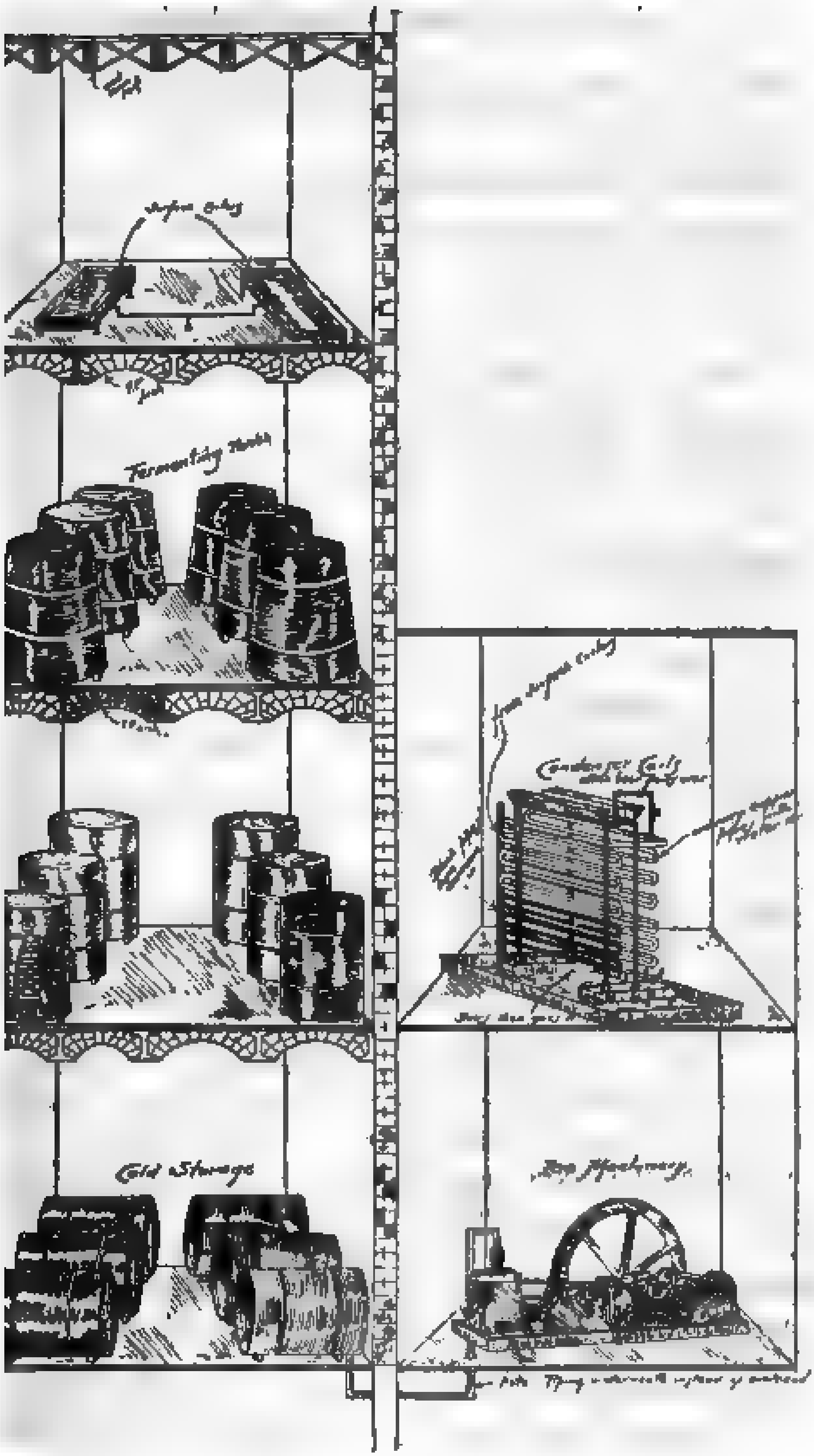


FRONT ELEVATION
"STERLING" IMPROVED AUTOMATIC
FURNACE FEEDER FOR TWO BOILERS

"hop-jack" where spent grain is removed and liquor pumped to coolers, then fermented in wooden vats, and "racked" or drawn off in kegs.

Hazards—In kiln house, the setting of the furnace supplying the heat to dry the grain. Where furnace is directly under the drying floors, the grain is apt to fall on the furnace and ignite, therefore the top of furnace should be hooded. Where brick-set furnaces are located in building adjoining, the heated air is blown or forced into the kiln house through brick flues. These buildings should be cut off from balance of the plant. The suction fan over kiln floors at roof collects considerable dust, and fires are caused by friction of machinery and dusty bearings. In "Brew" house the "lofters" or "legs," which are traveling belts, enclosed in wood boxing, on which buckets are fastened, conveying grain from one floor to another. They should be of metal; whether of wood or metal they should have explosion vents The latter are small doors kept closed by spring hinges The force of a dust explosion opens these doors sufficiently to cause a lessening of the force of the explosion. The "strut" board of lofter over which passes the belting should be slanting to prevent the grain from collecting and causing friction fires in bearings. The "boot" or lower part of the lofter should also be slanting and kept clean. Malt mill to be of all metal design with magnets at the rollers where malt is crushed to catch all metallic substances, thus preventing sparks at the rollers. Also springboards under the rollers will keep malt packed against the rollers, preventing an accumulation of dust which in the event of a spark would explode. An automatic steam jet at this point would extinguish fire, resulting from such dust explosions Screeners should have magnets where grain enters through hoppers, also at grain bins through which pass the lofters.

Incidental hazards are cooper shops with pitch kettle Pitch kettles are usually heated by direct fires and ought to be outside the buildings under separate cover. Storage of repairing and varnishing old fixtures. Branding kegs. The branding iron used to impress the name of the brewer on the keg is sometimes heated by an improvised gasoline fue



om "*Live Articles on Special Hazards*," pub. by "Weekly Underwriter."

Cold Storage House.

appliance. Stables with blanket drying room, garages. (C. E. Jahne, "Live Articles on Special Hazards," The Weekly Underwriter.)

BREWERY GRAIN DRYERS—Grain is received from the hop-jacks of breweries and used by farmers for cattle feed. The water is pressed out, the grain dried in large, revolving, steam-heated dryers, then ground in knife-grinder and bagged. Usually of frame construction in outskirts of city and "shafty." The floors are pierced by elevator legs, chutes and hoppers. Boiler hazard.

BRICKS should not be laid in freezing weather. Frost expands the water in the mortar and thrusts the brick out of position.

Enameled Bricks will resist enormous heat.

Fire Bricks are made from a mixture of several clays, to which has been added a certain amount of ground brick or quartz. Used for furnace linings, etc. Have greater endurance than building brick.

Pale Bricks are those improperly burned and are useless for building material.

Radial Bricks are perforated radial blocks made of tested clays.

Soft Bricks should never be used.

BRICK-ARCHED—An arch of brickwork laid or sprung between "I" beams, as "brick-arched" floor or roof.

BRICK-FILLING or BRICK-LINING—A stud wall filled in with brick. Although classed as frame, it frequently proves to be very valuable in preventing spread of fire. The brick filling should extend to the roof boards when frame buildings are built adjoining. See Frame Rows.

BRICK-NOGGING (used in place of wood-nogging pieces) makes a fire stop between studding at each floor by one thickness of brick set between the studs.

BRICK VENEER—One or two thicknesses of brick used in place of clapboards in frame construction. Classed same as frame buildings.

BRICK WORKS—Bricks are made of clay, principally silicate of alumina with perhaps lime, magnesia and oxide of iron. *Made by hand* or machinery, air or artificially dried,

then burned in kilns. Kilns are permanent, or of knock-down type, built up aroud the arch of bricks to be burned, and fires built directly under the bricks. Permanently built kilns are the safer. Considered poor fire risks. Physical hazards of boiler location, storage of hay and straw for packing, artificial drying. Moral hazard induced by exhaustion of clay deposits, poor transportation facilities, class of help. Usually large frame areas out of protection. See Tile Works.

BRIDGING JOISTS are those which extend from trimmer joist at flues or fireplace to the opposite wall.

BRIMSTONE—Is sulphur in its raw state. It should not be stored near goods subject to spontaneous combustion, for should fire break out, its vapors would not allow firemen to get near the premises. See Sulphur.

BRINE SYSTEM—(Indirect) cold storage. See Cold Storage.

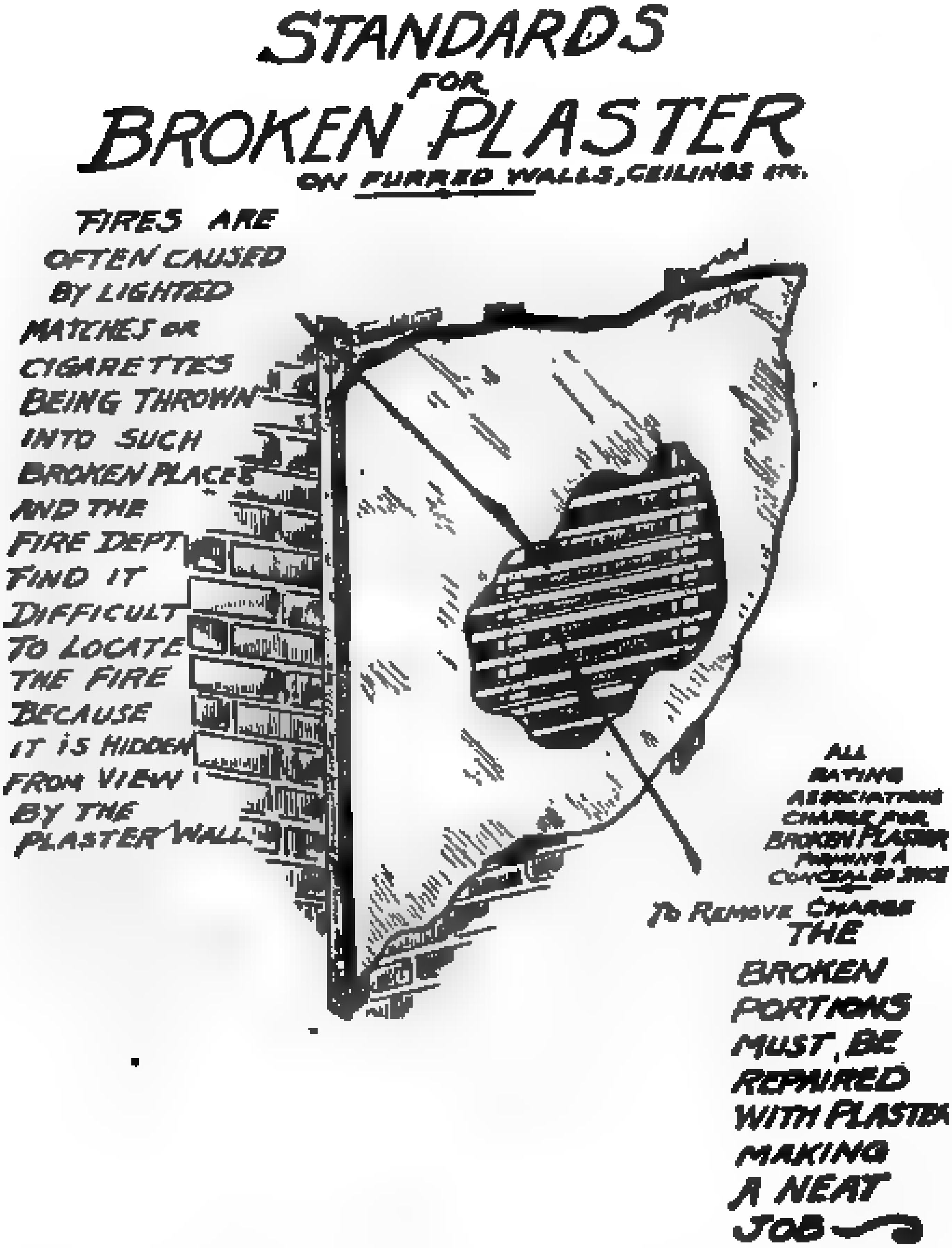
BRIQUETTES—Used in place of coal. Made of ground coal, coal dust and crude oil or other heavy oil or pitch. Process is grinding or pulverizing coal, mixing with oil, and hydraulic pressing. Oil storage important hazard.

BRISTLES used in brush-making. Prepared from hides which are first softened with unslaked lime and water in a tub, and the hair pulled out by hand, then cleaned with a mixture of peroxide of hydrogen and muriatic acid, and further cleaned with soap and water, wrapped in bundles, dried. For coloring, the small bundles or wads are dipped in boiling permanganate of potash. If white ends are desired, peroxide of hydrogen will bleach the permanganate and leave the ends white. Combed by hand. Dry-room principal hazard.

BRITISH GUM (dextrine)—A stiffening substance extracted from potatoes, wheat or rye. Used by calico printers and for sizing. See Dextrine.

BROKEN-JOINT—An arrangement of material such as brick, laid in courses so that no two joints are immediately over each other. See Bond; also Break-Joint.

BROKEN PLASTER on wood lath as used for ceilings, etc., must be repaired to prevent fire from readily gaining access to the concealed spaces back of it. See Furring.



BROKER—One who negotiates insurance contracts. A business representative of the insured, not of the company. For the commissions received from insurance premiums, he looks after the insurance interests of his clients.

Brokers or agents who agree to procure insurance on *terms and conditions* as agreed between them and the owner,

and then fail to properly protect the owner as agreed, become legally liable for the loss if fire occurs, to the extent of their negligence. See Agent.

BROMATES are bromic acid compounds. No fire hazard.

BROME—A deep red brown volatile liquid, obtained from mother-water of salt works or from the ashes of sea plants by treating with chlorine.

BROMIDES—Compounds of bromine with metals (potassium bromide). No fire hazard.

BROMINE is obtained from sea and mineral spring water or seaweed. If united with antimony, arsenic or copper it will burn fiercely. If mixed with potassium it explodes violently, producing potassium bromide. It is volatile but not inflammable.

BRONZE COLORS—Made from metallic bronze, sometimes mixed with such dangerous liquids as collodion and amyl acetate.

BRONZE FOUNDRIES—Use iron, copper or silver nitrate for coloring the bronze castings. The nitrates are diluted, applied by brush, and the castings baked in an oven.

BRONZE POWDERS—Usually are alloys of copper with zinc, tin or aluminum. They are made by pulverizing the scrap metal under stamps, sifted, separated and polished in tumblers. A blower system should be installed, where manufacturing, to remove dust, marine electric fixtures provided, enclosed switches, and there should be no open lights. All metals combine with oxygen, but only a few do so when dry. When moist some will combine with oxygen so quickly that the temperature will be raised to the ignition point. Aluminum and bronzes are of this type, and the slightest dampness is enough to cause spontaneous combustion. It will also form explosive mixtures when supported in the air, and will ignite by a spark or open flame. A severe hazard in the manufacture of bronze powder is shown in a report of the Boston Manufacturers' Mutual on a recent fire in the works of the Aluminum Company of America at New Kensington, Pa. This fire destroyed four buildings and seven lives were lost with fifteen others badly injured. See Aluminum.

BRONZING LIQUIDS usually contain pyroxylin or soluble cotton dissolved in volatile, inflammable solvents. Classed as inflammable.

BROODERS—See Incubators.

BROOM CORN—See Broom Factories.

BROOM CORN ROOT—(Fire Report.) Packed in bundles, wrapped in matting and tied with either rope or wire. It was piled solidly. Where the rope or wire had not burst, only the edges of the stock was damaged, the interior of the bundle remaining undamaged. Some of the bundles burst and the broom corn root was either burned or water-soaked and partly discolored. The fire indicates that where this material is piled in solid formation considerable salvage can be expected.

BROOM FACTORIES employ power machinery such as seeders, wood-working and metal-working machines. Hazards are gluing, varnishing and bleaching. Bleaching is done by burning sulphur or a sulphur compound in the center of a room in which broom straw is placed. Cheap labor is employed and crowded lofts or buildings are general. Broom corn liable to spontaneous combustion under some conditions. A poor fire record class.

BRUNOL—A dark liquid used in shoe factories, probably a mixture of tar and creosote oil. Flash point in closed cup tester about 240 degrees F. Burns readily at 310 degrees F.

BRUNSWICK GREEN—See Chrome Green.

BRUSH FACTORIES—There are many different kinds of brushes, requiring different methods of manufacture. The bristles and hair are usually received ready to use. Woodworking machinery of various kinds used for making backs, and metal-working machines for parts. The wood backs are stained, painted, varnished, enameled or celluloid covered. In the latter process the wooden backs are slightly warmed on a steam-heated table, a thin sheet of celluloid cemented on, placed in a screw press, then the celluloid edge sandpapered and trimmed. In finishing department, each worker has an individual cup or air brush for touching up with lacquer, shellac or liquid bronze. The metal parts require

japanning or enameling. The bristles are glued, or pitch or rubber-set. Vulcanizing rubber, and use of rubber cement thinned with naphtha are necessary. The main hazards are wood and metal-working, with painting, varnishing, japanning and enameling, pitch and glue heating, handling of celluloid, use of benzine, dry rooms, and vulcanizing rubber.

Twisted wire brushes have no backs, the bristles being twisted in with the wire. The only hazards are the clippers and combers, which are run by individual motors. These risks burn fiercely. See Bristles.

BUCK is a small pressing board on top of pressing tables in clothing factories. Steam-heated ones, used without table, but require a small individual gas-heated boiler to generate steam. See Pressing Tables.

BUCKETS—See Fire Pails.

BUCKRAM, used for hat frames, is cloth sized with glue, dried on cylindrical or tentering dryer.

BUCKRAM LININGS are dyed and sized. In dyeing, aniline colors, muriatic and sulphuric acids, chloride of lime, tannic acid and caustic soda are used. Gums and starches are used for sizing. The gums are sometimes heated by direct fire.

BUCKWHEAT, ground, is said to ignite spontaneously if damp.

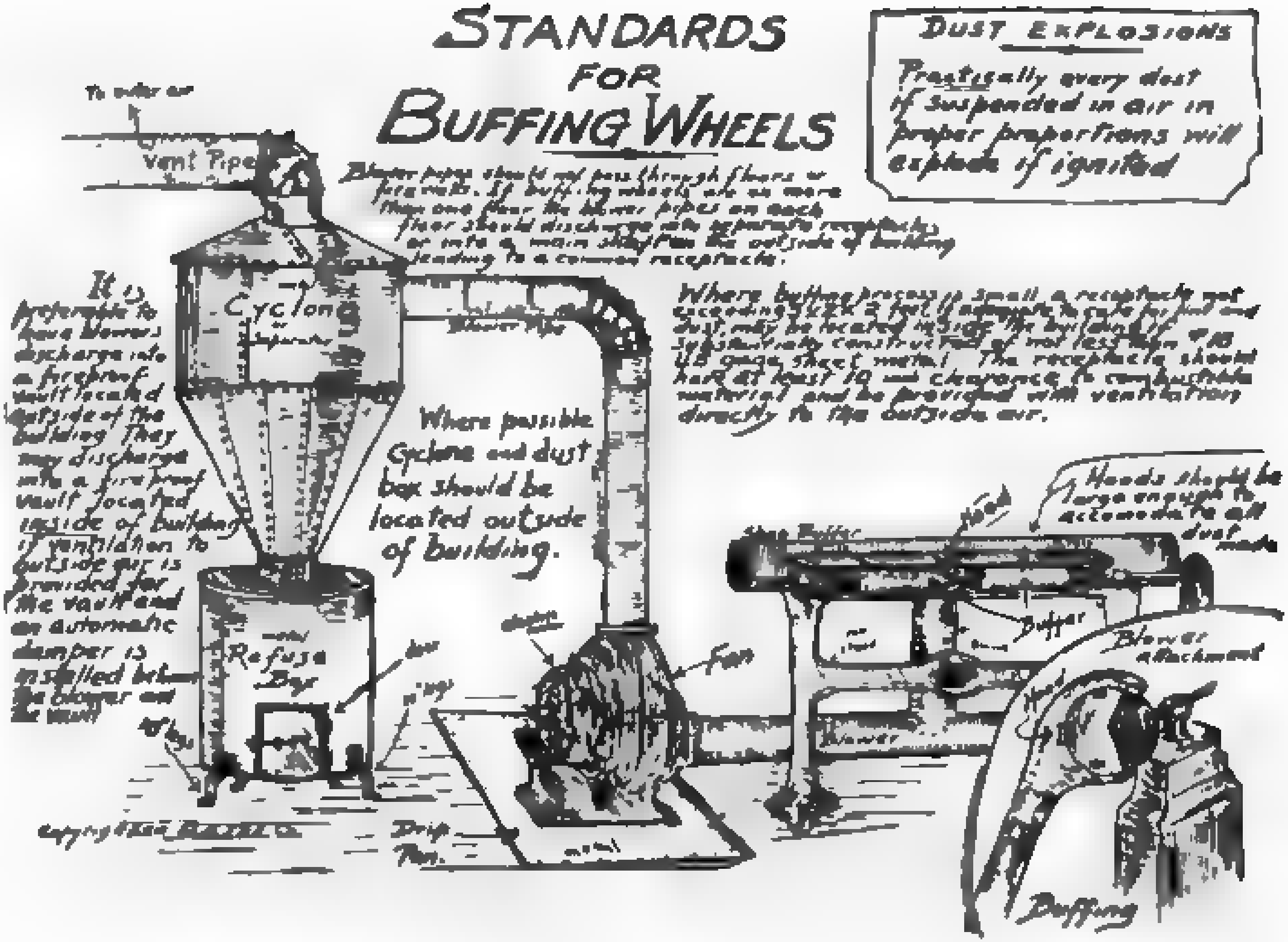
BUFFING is polishing. Polishing wheels usually operated by power. Considerable lint made during this process.

BUFFING WAX usually contains emery dust, paraffin, stearic acid, petrolatum, and mineral waxes.

BUFF WHEELS—Pieces of cloth glued and sewed together forming a wheel. To produce a high polish on brass goods without lacquering, the brass part is fixed on a movable iron frame which gradually forces the brass against the bluff wheel. Fires have arisen when inexperienced workmen have caused undue friction by applying too much pressure against the buff wheel. This sets fire to the buff wheel, and the flames are sucked into the blower system. All buff wheels should have the blowers attached to carry off lint and dust.

BUILDERS' *MATERIAL* YARDS—Stock includes brick,

STANDARDS FOR BUFFING WHEELS



lime, cement, lath, tiling, and flue pipe. Lime and cement should be skidded and under cover. Unslaked lime will cause fire. Cement, if wet, will cake and be practically valueless.

BUILDERS' RISK is generally understood to constitute work of a structural nature that requires underpinning or shoring walls, constructing or reconstructing building or additions thereto or enlarging the premises. See Mechanics' Privilege. See Course of Construction.

BUILDING SALVAGE—See Salvage.

BUILDINGS—In 1910 there were about 12,000,000 buildings in the United States of which approximately 11,000,000 were frame construction. In New York City there are approximately 400,000 buildings of which approximately 60,000 are rated by schedule.

BUILDINGS SET ON PILES, such as at seashore, should be screened around piling to prevent papers and trash from accumulating under building.

BULKHEAD—The enclosure of a stair, elevator or other shaft or cornice built above the roof.

BULKHEAD BUILDING—The shore end of a pier. Usually a story higher than the pier proper and used for offices and store-rooms.

BULLION—See Uninsurable Property.

BULL'S EYE GLASS has been known to cause fires when bubbles or defects in glass concentrate the sun's rays on certain combustible material like celluloid.

BUNKER ROOMS in cold storage plants are sometimes, as in all plants furnishing their own steam, coal storage rooms. This term is applied here usually when plants have expansion coils in refrigeration rooms or congealing tanks. Some plants have a special room for expansion coils or brine pipes only. These rooms are frequently referred to as bunker rooms.

BUNSEN BURNER—A single-flame upright gas jet, set on metal base and usually connected with rubber tubing. Used by jewelers, metal workers, dentists and in laboratories. The gas shut-off to be at permanent wall connection and set on metal *covered table* with air space under the metal.

BURGUNDY PITCH—A resin obtained from the spruce fir.

BURLAP—Said to be subject to spontaneous combustion when oiled or dyed. New burlaps are packed for shipment in solid bales, wrapped in burlap and bound with wire. The fire record is poor.

BURNAL—Same as Paraffin No. 7, used for the treatment of burns. It is a prepared wax.

BURNETTIZING (fire-proofing) WOOD—The timber is immersed in a solution of zinc chloride, or the fluid may be forced through the pores of the wood by pressure. This tends to harden the wood and renders it partially incombustible.

BURNING OFF PAINT—Most insurance companies decline to grant a privilege on policies to burn off paint with gasoline or kerosene torches on account of the many fires attributed to this cause. They will, however, grant a privilege to use certain paint removers.

BURNING POINT of a substance, the temperature at which it will take fire. See Flash Point.

BURNING POINTS OF WOODS—The burning points of wood ranges from 400 to 600 deg. F. By burning point is meant "ignition" point. The all-resinous woods have the lower point of ignition and are also apt to give off an inflammable vapor. Non-resinous hardwoods have perhaps the higher ignition point. It is claimed that California red wood has the highest ignition point. This claim, however, is made by manufacturers who deal in products made of this material. See Ignition Points of Wood.

BURNISH—To polish by rubbing. Applies chiefly to metals.

BURR STONE—A type of millstone. Susceptible to cracking for application of heat and cold water.

'BUS BARS—Bars or rods from which various transmission circuits of an electric power distributing system are supplied, and to which the leads from the generators are connected for convenience of control. Usually applied to main *conductors of an* electric switchboard.

BUSHING—Insulating sleeve or collar. A fitting for making pipe connections.

BUSINESS BLOCKS IN VILLAGES—Mainly frame buildings built in rows and contain the postoffice, opera house, variety store, paint store, and other retail stores. Often have communicating roof spaces. Bad fire record. See Frame Rows; also Country Stores.

BUSINESS IN WOMAN'S NAME—See Names.

BUSINESS INTERRUPTION INDEMNITY—See Use and Occupancy.

BUTCHER SHOPS—Considered good insurance, as the greater liability is on fixtures rather than stocks. May have an unsafe gas stove in the rear, an unsafe swinging gas bracket at ice box, and a small amount of saltpetre for corning beef. Sawdust is found on the floors of this class. Sausage-making and meat-packing. The fire record is good in even the poorest grade of shops.

BUTTER DISHES—Are made of wood or waxed paper. In the latter process, an automatic machine waxes one side of the paper, forms the box and binds the ends with wire. The paraffine wax is heated at the machine by direct gas heat similar to a stripper in a paper box factory. Paper cutters and slitters also used. Floor under and around waxing machine should be kept free from scraps. Hazards are similar to paper box making.

BUTT HINGES—An ordinary hinge, not approved by underwriters unless bolted to iron frames or brick walls.

BUTTONS, CELLULOID—Colored celluloid is received in sheets. Stamping presses, cutters, boring lathes, turning and frazing machines, emery, buff and sandpaper wheels, gas or steam-heated die presses, gas blow-pipes, drop-hammers are used in making the various articles. Steam and hot water are used for heating the moulds. Highly inflammable liquids are applied by hand or air brush and contain collodion, acetone, amyl acetate and mineral colors. Dry-rooms with air impregnated with explosive mixtures are serious hazards. See Celluloid.

Cloth-covered Buttons—Cloth scraps are cut into shape by hand, *fitted over metal* form, and pressed together.

Frayed or rough edges singed with gas flame injected in revolving metal cage or the buttons are lightly covered with alcohol and set on fire in rapidly oscillating or revolving metal screen. Care should be given to scrap cloth, paper linings and cotton padding.

Composition Buttons—Made of rosin, clay, pulverized rock, wheat paste, mineral oils and colors. These are mixed together, heated in steam kettles, rolled into sheets on steam tables, cut into shape and dried.

Glass Buttons—Glass received in bars, reheated in gas furnaces, pressed into shape while hot on gas-heated presses, and gradually cooled in small lehr. Hazards are gas-heated furnaces, lehrs and blow pipes.

Horn, Ivory, Pearl and Bone Buttons—Process similar in all these, including "vegetable" ivory, which is Tanqua nuts from South America. Process is boring, cutting, drilling, smoothing with sand and emery wheels. Hazards are dirty bearings on high-speed machines and dry rooms.

Metal Buttons—Contain general machine shop hazard with metal working, lacquering, buffing, plating, and dry rooms.

Pearl Buttons—The pearl used is from clams and oysters, sometimes called mother-of-pearl. High-speed water-cooled saws used, including special machines for certain kinds of buttons. Pearl cleaned in dilute sulphuric acid, polished with sawdust in tumblers. Aqua ammonia and silver nitrate is used for coloring pearl to a darker shade.

Wood Buttons—Involves a wood-working hazard, boring, sandpapering, shellacing and varnishing.

BUTTRESS—A vertical projecting piece of brickwork or masonry built in front or in back of a wall to strengthen it, or a mass of stone or brickwork intended to support a wall or to assist it in sustaining the strain that may be upon it.

BUTYLENE—A gaseous hydrocarbon.

C

CABINET FACTORIES—Lumber is brought from yard, dried in kilns, taken to the mill and cut up into various sizes and shapes, the work consisting of cross-cut sawing, dovetailing, rip and resawing, mortising, carving and tenoning. The parts are placed in caul box prior to and after gluing and assembling. A coat of water or oil stain is applied, then varnished, rubbed with pumice, polished and packed. Hazards of wood-workers. See Carpenter Stoves.

CABLES—The best sign of the overloading of a cable (electrically) is given when the cable begins to get hot.

Cables used in deep salt water are made as follows: In the center there is a core consisting of strands of copper wire. This is covered with several coats of rubber. A coat of jute follows, then a layer of galvanized iron wires, and finally a layer of yarn and compound which forms the outer covering.

CABURYA—A fibre used for binder twine. Classed as hard.

CAGE CONSTRUCTION is a term peculiarly descriptive of that type of construction represented by the most advanced and approved practise, a framework of columns and beams, spliced at the joints, riveted at the connections, stiffened by an efficient bracing of rods, portals or gussets that make it independently safe against any external force, leaving the thin and light exterior walls with no duty to perform except that of providing protection and ornamentation to the building.—J. F. Kendall. (See Skeleton Construction.)

CAISSONS—See Foundation Work.

CALCINATION—Ores and chemicals are brought to red heat to expel volatile constituents, destroy organic matter and loosen the mass.

CALCIUM CARBIDE is made by the fusion of lime and coke, or quicklime and charcoal in an electric furnace at 3,000 degrees C. See Acetylene.

A substitute for calcium carbide is a disc made of crude oil, calcium carbide, sulphur, and sugar. These are cooked together and pressed into cakes.

CALCIUM CHLORIDE is obtained by dissolving chalk in hydrochloric acid. This is dried by evaporation and then fused. Carbon dioxide is evolved in the process. Also obtained in the manufacture of carbonate of ammonia. No fire hazard. There is a system of automatic sprinklers using calcium chloride. In unheated buildings calcium chloride is put in fire pails to prevent the water from freezing. See Extinguishers.

CALCIUM HYPOCHLORIDE—Also known as Chloride of Lime.

CALCIUM LIGHT RISKS—Storage of theater properties, lighting stands and apparatus, color mixture, asphaltum and alcohol, charging cylinders, air compressors, oxygen reducing devices, hydrogen and oxygen gas outfits for lead burning. Work consists of charging cylinders with illuminating gas using compression of 225 pounds. Reducing pressure on oxygen gas cylinders from 1,800 pounds to 225 pounds through a series of valves, the last being set at 225 pounds. This class should be written cautiously.

CALCIUM LIGHT TUBES for lighting are arranged in pairs of steel cylinders, one with oxygen and one with hydrogen. Inflammable.

CALCIUM OXIDE (unslaked lime or quicklime) is the same as caustic lime and calcium oxide. It is a white solid mass obtained by burning limestone (incombustible). If combined with water gives off great heat sufficient to cause ignition. Classed as hazardous.

CALCIUM PHOSPHIDE is a solid mass which decomposes on contact with water, forming hydrogen phosphide, which ignites spontaneously on contact with air. Used in signal fires. Classed as inflammable. See Water.

CALENDERING—A process whereby material is finished

or glazed by being passed over or under the surfaces of steam-heated cylinders.

CALICO PRINTING WORKS—Fires in this class are caused by spontaneous combustion generated by the oxidation of the iron mordants in the cloths. To avoid fires, goods should be run in the open air long enough to become cool and allow them to get rid of the heat and moisture with which they are charged when they leave the hot cylinders.

CALK OR CAULK—To fill seams with something to prevent leaking. Oakum is generally used.

CALORIMETER—An instrument for measuring heat.

CALORIZING IRON—No mass of iron, no matter how large, can be heated red in contact with air without rusting. At temperatures above red heat iron rapidly oxidizes and scales away, or, in other words, burns. Calorizing is a process discovered by T. Van Aller, for prolonging the life of iron (or copper) by heating metals in a revolving drum with a mixture containing finely divided aluminum which produces a surface alloy on the metal, thus preventing the metal from burning and providing means of frequent renewals when used in laboratories where high temperature furnaces or retorts are used.

CAMPHENE—A mixture of three parts alcohol and one part turpentine; resembles camphor. Inflammable.

CAMPHENES—Ethereal oils destitute of oxygen (oil of turpentine, etc.).

CAMPHOR is obtained by boiling the wood of certain Chinese or Japanese trees. Boils at 400 degrees F., and gives off an inflammable vapor. It is inflammable.

CAMPHOR (oil of) is obtained by the solution of camphor in nitric acid. When treated with iodine it detonates and causes fire.

CAMPHOR BALLS OR FLAKES—Naphthalene moth camphor is inflammable; melts quickly to a thin liquid and gives off vapors which attack the eyes. The vapors are readily ignited.

CANALS AND FEEDERS—Entering into large bodies of water are usually *built for the* accommodation of the manu-

facturing establishments adjacent thereto and act as waterways for boats, supplying water-power, and sometimes as sewers. Surfaces, as a rule, are oily, due to the waste material let into the canal.

CANAUBA WAX—Extracted from the leaves of the Canauba palm. Melting point 185 degrees F. Used as a cement.

CANCELLATION—Policies may be cancelled at any time at the request of the insured, in which case the company shall, upon demand and the surrender of the policies, refund the excess of paid premium above the customary short rates for the expired time. Company may cancel policies by giving to the assured a five days' written notice and if there be a mortgagee, the company must give them a ten days' notice. When company cancels of its own volition a pro rata return premium is made to the assured.

Policy written for one year from February 1st, 1919, to February 1st, 1920: Amount $1,000, rate 50c plus 10 per cent premium $5.50. On March 15th, policy is cancelled.

If cancelled at company's request or if to be rewritten, policy is cancelled "pro rata."

Example: (Pro Rata)

Time in force	Feb. 28 days
	March 15 days
Total	43 days

Yearly Premium	$5.50
Monthly Premium	12) 5.50(.458
Daily Premium	30) .458(.015

43 days x .015=.645 premium for 43 days. If premium has been paid to company, deduct .645 from $5.50 which will equal $4.85 amount of return premium due assured.

If policy is not rewritten and is cancelled at the assured's request, it is cancelled "short rate."

Example: (Short Rate)

Time in force—43 days which, according to the regular

"short rate table," calls for a 45 days charge, 27 per cent. of the yearly premium.

Yearly Premium $5.50 minus 27 per cent short rate for 45 days, leaving $1.485 premium due company.

If premium has been paid to the company, deduct the $1.485, which would leave $4.01, the return premium due assured.—(H. G. Boyle.)

CANCELLATION NOTICES are sent by registered mail, messenger, sheriff or constable. Receipt must be signed by all parties interested as assureds.

CAÑDELIA—See Vegetable Waxes.

CANDLE FACTORIES—The raw materials used may be of animal, vegetable or mineral origin, such as tallow, spermaceti, paraffine or other waxes. The processes employed are: Tallow in common with mineral fats consist mainly of stearine and olein. It is decomposed into these two constituents by treating it in large copper digestors set over brick furnaces. In these the tallow is treated with superheated steam at a pressure of about 150-160 pounds, equalling a temperature of 365-375 degrees F., the cylinders themselves being heated by direct fire heat. The resulting mixture of the stearic and oleic acids is pressed to remove the former from the latter, which is a liquid. The stearic acid is then melted and run into candles, and the crude oleic acid is barrelled and sold to soap-makers under the name of Red Oil. Hazards: The manufacture of stearine from tallow is an important hazard. Occasionally the digestor explodes, in which case the melted fat would be scattered about. The hazard of the raw materials is the large quantities in which they are stored, all of which are combustible. The entire process is generally steam.

CANDLE-POWER is the measure of brilliancy. It is the definite term fixed by American law as the amount of light given by a candle burning 120 grains of wax per hour.

CANDLE STRUCTURE—See Flames.

CANDLES are responsible for many fires during the holiday season in certain congested sections of Greater New York and during religious holidays when used on mantels or Christmas trees. Celluloid candlesticks, under the name of

"Composition Ivortur," "Imitation Ivory" and "Domestic Ivory" have been found on sale in department stores. Most of the candlesticks have a cup-shaped metal cap placed in the top and used to receive the candle. The manufacturers claim that this would prevent the candle from igniting the pyroxylin. It was found, however, that such is not the case, for when the candles were lighted and allowed to burn down the candlestick ignited and burned with the customary intensity. They should be prohibited. See Holiday Celebrations.

CANDLING EGGS—Eggs are held in front of a small aperature in an enclosure containing a light which allows the candler to ascertain if there are any blood spots or water spots in the eggs. Dark rooms are required. Carelessness in handling packing material, electric light cords hung on nails, kerosene oil lamps or candles cause many fires. Candling was first done by holding the egg in front of a candle. See Eggs.

CANDY FACTORIES—The materials used are sugar, glucose, chocolate, essential oils, flavoring extracts, syrups, nuts and spices. Starch is used incidentally. The hazards are "batch warmers," which are used to keep stock from setting. They resemble a hood of metal set on a bench with gas burners under same. If direct fire heat is used, they should set on an incombustible base and have a permanent iron gas pipe connection. Candy furnaces are cylindrical iron, fire brick-lined stoves, coke or coal fed with the grate near the bottom and the candy kettles resting directly over the fire. The principal danger is the likelihood of the candy boiling over into the fire, where it might flare up and ignite the ceiling or run over the floor. The furnace should set on proper brick ventilated foundation and have metal hood above it. Coaters and Tumblers: Candies with nut centers and sugar-coated are made by tossing and tumbling in spherical copper vessels, steam heated, and have practically no fire hazard. Dipping Pans: These are for dipping unfinished candies, generally in melted chocolate. The pans are usually set in the work table and heated by steam. Kettles: In addition to the kettles used on the furnaces, stationary copper and iron kettles (steam heated) are used for melting sugar,

glucose and syrup. Peanut Roasters: These are generally small rotating iron cylinders heated by gas, coke or coal. They should be properly set and guarded from inflammable materials. Vacuum Pans, sometimes used for boiling sugar and syrup, present only the hazard of steam pipes. Starch Bucks are employed to coat the candy with starch. These machines are motor-driven with a shaking and shifting motion. Very little dust escapes where these machines are used, although open lights should be removed from the immediate vicinity. Starch Dry Rooms: Candy is moulded in depressions made by patterns pressed upon the flat surface of powdered starch, held in wooden trays, the soft candy being let into the moulds by means of droppers or tin vessels. To facilitate the setting of the candy, the starch trays are placed on racks in dry rooms, which are generally frame and steam heated. Dry rooms should be built of fire-proof material, properly vented and without open lights. Fair insurance. See Starch Buck.

CANDY WARMERS—See Candy Factories.

CANE AND RATTAN WORKS—As used for chair seats, furniture and baskets. Cleaned and bleached with hydrofluoric acid and chloride of lime, split, shaved and dried. Hazards of dry rooms, soaking tanks, shavers, splitters, gluing, machine shops, weaving cane seats, varnishing, shellacking or painting. Without these latter the hazard is mild. Risks of this class burn with a heavy black smoke which seriously handicaps the firemen.

CANNED GOODS—Generally considered by underwriters to be excellent insurance, as the contents are hermetically sealed. May suffer a severe loss should even a small amount of water remove the labels and thereby destroy the identity of the goods therein. When packed in cases, this is not so apt to occur. (Fire Report)—The fire was intense enough to burn through the light wooden cases, and in some cases to scorch the labels on the cans. All the goods can be identified. The action of heat on the contents of the cans can only be determined by opening the cans. Sunset Warehouse fire, August 24, 1918.

CANNEL COAL—A bituminous variety used by fire

departments and in open-hearth grates. Ignites more easily than ordinary soft coal on account of the large percentage of gases which it contains.

CANTILEVER—A lever fixed at one end and supporting a weight or resisting a force by virtue of its own stiffness and the strength of its attachment to the support.

CAOUTCHOUCINE (or coutchine) is a water-proofing compound and a solvent of resinous substances prepared by vaporization of india-rubber at a temperature of 600 degrees F. Hazardous.

CAP—Post Cap. The top member (flat) of a column or post.

CAPACITY OF WATER TANKS—See Tables.

CAP FACTORY—Cloth caps, largely made from scraps or piece goods. Celluloid for visors, cotton batting for stuffing, embossing ornaments, hydraulic presses, dry rooms and sewing machines. Habitually untidy and generally cheap class of help. Unprofitable class.

CAPITAL OF A COMPANY—The money furnished by the stockholders to give stability as required in the organization of a company, thus providing funds from which the policy-holders can draw in case of emergency. It is a liability.

CAP STONE—See Bond and Cap Stones.

CAR BARNS—See Railroad Car Houses.

CARBIDE—Term generally used when referring to calcium carbide. Practically every carbide generates an inflammable gas when brought in contact with water.

CARBIDES—Compounds of carbon and metals. Some are explosive.

CARBINOL-METHYLIC ALCOHOL or wood spirit. Inflammable liquid.

CARBOHYDRATES—Consist of carbon, hydrogen and oxygen. They are commonly found in sugar, starch, etc. Not hazardous but their presence increases the intensity of the flames.

CARBOLIC ACID or phenol is derived from coal tar. It *is a solid at ordinary* temperature. Melts at 108 deg. F.

Not explosive in itself. Manufacturing hazard is mild. Poisonous, corrosive.

CARBOLINEUM—A chemical fluid used for preserving wood. Base is heavy coal-tar product mixed with chlorine gas. Flash about 280 degrees F. Free from combustion.

CARBOLIZING—Consists of extracting the sap and water from the timber and driving carbolic or tar acids through the timber.

CARBON—This element is distributed in nature in the free condition, in organic substances, and is the basis of all organic substances. It appears in various forms, the most common being that of charcoal, and the various kinds of coal, of which the latter are chiefly carbon.

CARBONATES—Are salts of carbonic acid.

CARBON BISULPHIDE—Produced by passing the vapor of burning sulphur over charcoal kept red hot. Highly inflammable. Vapor mixed with air takes fire at 300 deg. F. A solvent for fats, oils, india-rubber, phosphorus, bromine, iodine and camphor. It is used as a solvent in making rubber cement. In hard rubber works the articles are dipped in it (called cold vulcanizing). Also used in cheap grade paints and as an insect destroyer in tobacco factories. A lighted cigar or pipe, lantern or lighted match if brought into a mill building when filled with this gas might cause an explosion. This gas is 2.64 times heavier than air. Should be stored under water. When stored in steel drums, the hazard is not severe. Flash zero F.

CARBON BLACK (Lamp Black)—Consists of light and finely divided carbon. It is obtained by burning oil or gas with a smoky flame. Will ignite spontaneously. Classed as inflammable solid. Fires are caused by the sparks remaining from the manufacturing processes. Vapor from carbon black is used as an insecticide to kill weevils in grain. This is dangerous. A safer process is a gas flame made of sodium or potassium cyanide and sulphuric acid.

CARBON BRUSHES, used on motors, are made of carbon and graphite.

CARBON DIOXIDE—See Carbonic Acid.

CARBON DISULPHIDE—See Carbon Bisulphide.

CARBON MONOXIDE is a poisonous gas ever present during a fire where incomplete combustion is evidenced. It is present in smoke, steam and carbon dioxide. Carbon monoxide has a toxic action.

In fighting fire, firemen begin first to ventilate the building at its highest point and thus give vent to the heated and poisonous gases and smoke. There is, however, an element of danger attached to ventilation, that is, when an opening is made, oxygen is admitted which combines with the heated air and thus evolves an explosive gas which might spread the fire to other parts of the building.

CARBON OIL—See Hydrocarbon.

CARBON PAPER AND TYPEWRITER RIBBONS—Use mineral waxes, beeswax, Japanese wax, carnauba wax, carbon black, lamp black, castor oil, olive oil, neatsfoot oil, lard oils, vaseline, turpentine, alcohol and paraffine. Hazards of mixing and grinding colors and ingredients, heating waxes and oils, applying mixture to paper and fabrics (a cold process), glue-heaters and storage of materials. Burn fiercely with heavy dark smoke. Hard fires to extinguish. See Typewriter Inks.

CARBON TETRACHLORIDE—Used as a basis for contents of fire extinguishers and for cleaning fluids in place of benzine. Made by passing chlorine gas over heated carbon bisulphide, and the product condensed in a cooler. A mixture of carbon tetrachloride and sulphur is thus obtained. By introducing caustic soda or potash the sulphur dichloride is decomposed and dissolved, precipitating the purified carbon tetrachloride. It is non-hazardous and noninflammable. See Extinguishers.

CARBONA—Carbon tetrachloride and gasoline mixed. Non-inflammable.

CARBONACEOUS SUBSTANCES—Many have no nitrogen in them, and carbon is their most important element. Sugar, starch, oils and fats are carbonaceous substances.

CARBONATE OF AMMONIA is made by heating in closed iron vessels, bones, hartshorn or other animal matters and then purifying them by sublimation. Ammonia is given off in the process.

CARBONATE OF LIME is marble which contains lime and carbonic acid.

CARBONATE OF POTASH is obtained from the ashes of plants, and the action of caustic potash with carbonic acid. It is given off by animals and taken up by plants. No fire hazard.

CARBONATE OF SODA is made by neutralizing a carbonic acid solution with caustic soda. No fire hazard.

CARBONIC ACID—Is carbon dioxide dissolved in water.

CARBONIC ACID GAS OR CARBON DIOXIDE—Limestone is heated in ovens to about 1,400 deg. F. by fuel oil or gas. The heat breaks up the limestone into carbonic acid gas and quicklime. Gas is filtered through charcoal purifiers and passed to compressors. At high pressure and low temperature carbonic acid gas liquefies. Non-inflammable. Cylinders containing same should not be exposed to heat. It extinguishes fire because it eliminates oxygen, which is necessary to combustion. It may also be obtained by treating the carbonate with a mineral acid. Hazards of high temperature ovens and steam pipes in contact with wood.

CARBONIZING means charring a substance. This process is accomplished by direct fire heat, as a rule. See Embroideries.

CARBORUNDUM—Composed of sand, carbon and a little salt electrically melted, forming silicon carbide, the crystals of which are hard as diamonds and are used for abrasive purposes.

CARBOY—A large glass bottle or demijohn enclosed in a wooden crate and generally packed with straw to prevent breakage. Usually used for corrosive acids.

CARBURETOR is a device to atomize gasoline or other light hydrocarbons, and then mix it with air to make the combination highly explosive.

CARBURETS—Same as carbides.

CARBURETTED HYDROGEN is carbon or charcoal united with hydrogen.

CARDING MACHINES—Lay the fibre straight and form it into a *loose roving preparatory* for spinning.

In woolen mills, where cotton forms part of the goods, fires are caused by sparks igniting the lint or flyings. Sparks usually occur at the first or "licker-in" roll. Machines are fed automatically from a Bramwell feeder. Hazards depend upon the amount of cotton used (wool not readily ignited). Mills using the long, first-grade fibre-wool are the least hazardous. Cheap knitting mills and horse blanket factories use cheap grade of cotton and wool which contain considerable foreign matter. See Bramwell Feed.

CARDING ROOMS are more preferable if detached or cut off by fire doors.

CARELESSNESS—See Housekeeping, Dust, Constantinople.

CARNAUBA STRAW—Used in paper making. Burns fiercely.

CARNAUBA WAX—Comes from the leaves of a South American palm, greenish or yellowish in color and so brittle that it can be powdered. It is soluble in ether and boiling alcohol, and the melting point is from 176 to 194 deg. F.

CAROUSEL MANUFACTURING—A woodworking and machine shop hazard usually located in light, high, one-story frame buildings in sparsely settled locations. Not attractive fire risks. Cheap grade labor employed as a rule. Also have benzine-thinned paints. Where animals are made, the seats are apt to be upholstered with excelsior.

CARPENTERS' STOVES are three to four feet long, fifteen to eighteen inches wide, set on legs, and usually burn wood or shop refuse. See Cabinet Factories.

CARPET AND RUG MANUFACTURING—Imported wool received in bales, fed into the washing machines, then into the picking machine, and then to the dry room, where the heat from steam coils is forced through it by means of blowers. The wool then passes to the sorting room, where the blends are carefully made before it goes to the machine which tears the wool fibres apart and gets them into shape for the carding and combing processes. The wool is then blown into a spinning mill, after which it is ready to be converted into yarn. It passes through a *picking machine, which* blends the different grades of the raw

material, after which it is refined and purified. The wool is forced to the carding room through tubes by means of air pressure. It is then taken to the combing machines, which separate the long from the short fibres. The strands of wool are thinned out and given sufficient strength to stand the weaving process. The yarn next appears in rows of spindles in the "mule" room, where the yarn is twisted and brought to its final stage. At this point it goes to the dye-house to be boiled, bleached and colored, next to the drying house, and through a steaming process to set the colors, and then to the weave shop, where great skill is required in the assembling of the yarn and the matching of the colors. The skeins of yarn are wound on spools, which are put in sets at back of the looms, each color or set representing one frame of color on the rug. After the weave is completed, the rug comes out rough. It is passed through a finishing machine to remove the roughness on the surface of the rug or carpet.

CARPET CLEANING employs, as a rule, revolving drum-beaters enclosed in wood partitions, equipped with suction to carry off dirt and dust. Also have electrical vacuum apparatus, which sucks the dirt out of the material. No open lights should be permitted in cleaning rooms; good ventilation required. Hazards of dust, dirty bearings, washing in soap and water, dyeing, recoloring faded spots with aniline colors, dry rooms, pressing irons and sewing machines. Benzine is often used for cleaning.

In some households, the carpet which is tacked to the floor is cleaned by naphtha without removing it from the floor. The flooring becomes soaked with the naphtha. An open flame may ignite the arising vapor. Poor fire record.

CARPET SLIPPER MANUFACTURING—Cut, sew and tack the materials, using pasteboard insoles glued or pasted in place. Untidy shops and cheap class labor are the rule. A poor fire record class.

CARRIAGE AND WAGON SHOPS—See Wheelwright.

CARRIAGE CLOTH FACTORY—Principal hazard is the coating of the cloth which is oiled and varnished by dipping

in tanks, or by being run through a "coating mill." The cloth is hung in festoons in dry rooms.

CARRON OIL—A mixture of linseed oil and lime water. A good remedy for burns. Should be kept in every factory and home.

CARROTING—Spraying a weak solution of carrot oil, nitric acid and water, in dressing of furs.

CARTON—A box or container made of pasteboard or corrugated paper.

CARTRIDGE FUSE—A cartridge-shaped shell enclosing an electrical fuse. Used to prevent the molten fuse from igniting inflammable material that may be near by.

CARVERS—There are two types used in woodworking, i. e., duplicating and spindle. Spindle carver is a machine wherein a milling cutter is rotated very rapidly at the end of a horizontal spindle. Duplicating carver, one with a blank tool and small cutters, which are made to pass simultaneously over the outlines and surfaces of a pattern and the pieces to be carved.

CASE—A box for packing goods.

CASE HARDEN—To convert the outer surface of wrought iron into steel by heating to white heat in contact with charcoal, cyanide of potassium or sodium cyanide.

CASED GOODS—Goods unopened and in cases or original containers.

CASEIN OR LACTEIN—Made from skimmed milk. Used in manufacturing buttons, combs, glue, and for surfacing fine printing paper in preference to glue, as it is not subject to moisture. Skimmed milk is heated to about 135 deg. F., sulphuric acid (dilute) added to precipitate the casein, and the whey then drained off. The curd (casein) is drained, washed in water to remove the acid, dried and ground into powder. There is about 3½ per cent of casein in skimmed milk. Hazards are boilers, acid storage, dry rooms and stone grinders.

CASEMENT—Applied to a window which is hung upon hinges in place of cord and sash weight.

CASEMENT STAY—A bar or other device for holding a window sash open.

CASINGS—Sometimes called hog-middles. Casings for sausage are made from entrails, cooked, cleaned and dried, and require a boiler for steam kettles. See Abattoir.

CASSIA—Imported in bales from China wrapped in two thicknesses of matting and bound with rattan.

CAST IRON is very brittle, of granular nature and cannot be welded. When heated and suddenly cooled by water it flies into fragments. All iron work in buildings should be protected (insulated) with at least two inches of fire-proofing material.

CAST-IRON COLUMNS—On account of the heavy, irregular masses of metal forming the flanges, the beams, webs and brackets set up internal strains and stresses which are apt to cause invisible cracks which under any unusual conditions of loading or shock might cause serious calamity. Recommend fabricated steel columns properly protected by either terra-cotta or concrete.

CASTING—Pouring molten metal into moulds. Ordinary iron and brass castings are made in sand moulds. Iron moulds are used for "chilled iron castings."

CASTOR OIL is obtained from the castor bean, the seed of a plant indigenous to Southern Asia. The bean contains from 48 to 60 per cent of oil. The process of extraction is as follows: After cleaning to remove sand, trash, etc., the beans are crushed, packed in press cylinders and subjected to hydraulic pressure. The oil thus obtained is, after settling and clarifying, known as "cold pressed," or medicinal, and is in color from a water white to pale yellow, depending on the quality of the seed. The remaining 10 per cent of the oil content of the meat, after cold pressing, is heated or cooked and subjected while still hot to hydraulic pressure in box presses, the resulting oil being known as "hot pressed," or technical oil, and is in color from a pale straw to a brown tint. Approximately 5 per cent of oil still remains in the meat after the above process. In order to reclaim this an extraction plant is necessary. See Extraction Plants.

CATERERS—Combined hazards of bakers, confectioners and restaurants. Often have unsafe features in connection *with cooking and heating* apparatus.

CATHODES—Are made of rolled sheet copper dipped in hot paraffin and covered with plumbago to facilitate the removal of the copper deposited. When the copper has been deposited to the depth of 1/16 of an inch it is removed and used as a cathode on which additional copper is deposited until there is a solid plate about an inch thick. See Anode.

CAUL BOX—A long, oblong box with steam coils, used for drying lumber of small dimensions. Should be lined with lock-jointed tin and have wire screen over steam coils. Apt to become untidy with sawdust or shavings. Formerly these were heated by a smoke pipe or a stove passing through the box.

CAULK—See Calk.

CAUSTIC—A substance which burns or destroys animal tissue.

CAUSTIC LIME—See Lime, unslaked.

CAUSTIC POTASH—Made by electrolizing a solution of potassium chloride. Chlorine is given off in the process. A hazardous process. Caustic potash has very little fire hazard.

CAUSTIC SODA is an alkali. Made by electrolizing a solution of common salt. Chlorine is formed at the same time. A hazardous process. Caustic soda is not inflammable. When in drums and subjected to intense heat, it forms a solid mass.

CEILING LIGHT—A glazed sash in a ceiling usually under a skylight.

CELASCOL—A black liquid containing about 30% of naphtha. It is made principally for producing a shoe filler by mixing with ground cork.

CELESTROM EBONITE, BLACK LACQUER—Flash point 290 deg. F. Classed as non-volatile.

CELESTROM GLOSSY BLACK LACQUER—Flash point 290 deg. F. Classed as non-volatile.

CELESTROM THINNER—Flash point 290 deg. F. Classed as non-volatile.

CELESTROM TRANSPARENT LACQUER—Flash point 290 deg. F. Classed as non-volatile.

CELLAR—A room or enclosed space partly or wholly below ground. It is usually under a building.

CELLAR FIRES are usually hard to fight on account of the dense smoke. Generally when the fire department arrives they immediately start to ventilate the place by cutting holes in the floor or sidewalk lights. A special nozzle is used on the hose when access to the cellar cannot be gained. See Areaways.

CELLIT—A substitute for celluloid; does not burn very readily. Cinematograph films are approved by the British Fire Prevention Commission as non-flaming.

CELLUCOTTON—Trade name for a surgical dressing made of chemically treated wood pulp. Resembles somewhat absorbent cotton but is more brittle and fibrous. Burns readily.

CELLULOID—A trade name for a nitro-cellulose compound but as a generic term used to denote nearly all kinds of nitro-cellulose compounds. Can be worked with tools while cold or moulded like plaster when heated with steam. The basic element is known as cellulose, such as cotton or fine tissue paper. When cotton is used it is first washed in alkalies to remove dirt and oil, washed in water and dried, cut into small lengths and placed in earthen jars with nitric and sulphuric acids, 1 to 3 parts. This is called nitrating. It is next washed in water, dried in centrifugal extractors, and resembles snow when chopped very fine. It is then mixed with camphor and pressed into slabs in hydraulic press. At this point the material is not very inflammable. The slabs are broken up, moistened with alcohol, and colored with aniline tints, then castor oil is added. The product is then passed through steam-heated rolls, pressed in steam-heated presses into sheet form, dried and polished between thin sheets of polished steel. Worked in plastic state at 150-250 deg. F.; if heated to 300 deg. F. will decompose and burn without heavy flame, and may explode if confined. Little ether now used in its manufacture, which makes the process less dangerous.

Celluloid is used as substitute for horn, ivory, shell, pearl, wood veneers. Used in manufacture of harness rings, billiard balls, combs and hair ornaments, picture films, shaving brushes, brush and knife handles, collars, cuffs, buttons,

jewelry backings, decorations, emblems, piano keys, ladies' collar supports, eye-shades and wind-shields.

Celluloid burns fiercely, frequently accompanied by explosions. Most of the explosions are caused by the generating of gaseous fumes, due to the storing of material in poorly ventilated places.

Scrap Celluloid in heaps will ignite spontaneously and should be kept free from all other forms of refuse by placing in metal receptacles with self-closing covers. Scrap from button, comb and other similar risks is sometimes used in horn and fertilizer factories. Before being worked, scraps should be run over a magnet to remove all metallic substances. Ground scrap is used for making harness rings. Grinding and sandpapering produce dust and machines should have blower system with separator and metal receptacle partly filled with water in which is deposited the celluloid dust.

Comb Risks usually employ cheap labor. The work consists of shaping blanks and inserting stones. Blanks are warmed on sheets of metal over gas flame or steam pipe, then placed in hand moulds. The stones are inserted by use of a cement composed of celluloid and glacial acetic acid.

Button Manufacturing requires the use of stamping presses, blow-pipes for making rims and holders, gas-heated calenders and cold or heated foot-power die presses. Occasionally do photo work for taking pictures.

Toys require similar machinery to buttons. Hot water is used to soften and steam tables to mould sheet stock, saws and small boring lathes to work it. Steam tables are apt to become unduly hot and temperature should not exceed 225 deg. F. In working on celluloid, the danger from sparks is always imminent, especially at circular saws if foreign substances happen to be in the stock. In boring holes, the spindle is usually cooled with water, as are many of the saws. Dipping (coloring) involves the use of inflammable liquids and should be done in a separate fireproof building. An acetone thinned cement is used for cementing the different parts. Sheet stock, scraps, finished goods, all should be in separate *compartments or* buildings.

Imitation Leathers are made of cotton cloths and covered with nitro-cellulose in jelly form and polished with celluloid solutions. See Imitation Leather.

Trade names are Viscoloid, Pyroline, Fiberloid, Gallilith, Pyroxolin.

Celluloid Cement—Made by dissolving celluloid in acetone. Inflammable.

Celluloid Lacquer—A lacquer having a nitro-cellulose base with the addition of acetone. Inflammable.

CELLULOSE—An amorphous white compound, the basis of the structure of plants. Used as an absorbent.

Cellulose Acetate—(See Aeroplane Dopes).

Cellulose Nitrate—(See Aeroplane Dopes).

CEMENT—Natural cements are made by burning impure limestone at a low temperature (insufficient to vitrify). They do not slake with water, but require to be ground in order to convert them into hydraulic cement.

Portland cement is made by heating to incipient vitrification an intimate mixture of argillaceous and calcareous substances, which product does not slake with water, but upon grinding forms an energetic hydraulic cement.

CEMENT BLOCKS—Under-fire tests show that the usual thin webs crack under the application of very intense heat. Webs should be of sufficient thickness to withstand the stresses due to rapid expansion when heated. A building of cement blocks is classed as frame construction by most rating bureaus, especially if over one story in height.

CEMENT PLANTS AND PLASTER MILLS—There are two processes, the wet and the dry. Raw stock in the dry process is cement, rock, limestone and clay. In the wet process, marble and clay. Process consists of rock crushing, drying through slowly rotating iron cylinders heated by coal, and burning in kilns heated to 2,500-2,800 deg. F. The hazards are those usual to heat-producing devices, and should be located a safe distance from woodwork. Dryers should be in separate buildings. Coal pulverizing is very hazardous owing to the fine dust evolved. Grinding is an important feature. Many fires occur in this class.

CEMENTATION—The process of converting wrought iron into steel by heating it in contact with charcoal.

CENTERING—The supports of an arch while being built.

CENTRAL STATION—A central location where fire alarms are received and immediately transmitted to the fire department. They are superior to local or private alarm systems.

CENTRIFUGAL PUMP—A type of pump in which water is set in rapid rotation by revolving vanes. The water has a centrifugal tendency imparted to it which causes it to rise through a pipe whose mouth faces tangentially the direction of rotation. See Fire Pumps.

CENTRIFUGAL SEPARATOR OR EXTRACTOR—A machine used for separating the lighter from the denser liquids, or for separating liquids from solids. The machine rotates very rapidly on the principle that all liquids fly from the centre of rotation. Used in laundries, dry cleaning establishments, etc., for extracting liquids from the cloth. Sometimes called "whizzers."

CEREAL MILLS—See Flour Mills.

CERESINAL—A mineral wax.

CERESINE—A natural mineral wax, same as ozokerite. Melts at 140 deg. F.

CERIUM—This material, which is a complex alloy of cerium, lanthanum, didymium, and other metals of the cerium and yttrium group, is produced mainly from monasite sand residues by electrolytic methods. Its chief use is in the manufacture of ferrocerium, which is employed as a tinder in pocket cigar lighters, gas lighters, and to a large extent during the last three years for military purposes. Prior to 1917 the alloy was manufactured under Austrian patents, but, following the seizure of these patent rights by the Alien Custodian, licenses were granted to several American manufacturers to produce the metal.

CEROON—A package or bale made of skins.

CEROON OF INDIGO—A quantity of indigo incased in bark or thin wood wrapped in skin and sewed, then tied with leather or skin thongs; approximate size when baled is *from one to one* and one-quarter cubic feet.

CHAIR SEATS—Made of fibreboard which is cut to size by power cutters, embossed in gas heated presses, stained by dipping into water stains, then varnished.

CHALK—A soft earthy variety of limestone.

CHAMOIS—See Tanning.

CHANDELIER MANUFACTURING—Gas fixtures are manufactured from tubing and gas piping, then cleaned with soap or other compound, plated and lacquered either by dipping or air-spraying, using Egyptian or amyl acetate lacquer. Generally employ cheap labor and occupy crowded lofts. The hazards are the use of volatiles and lacquer in rooms with open flame lights. Considerable packing material is used. Fire record poor.

CHANDLERS—See Ship's Chandlers.

CHANGE OF INTEREST—The careful underwriter who receives an endorsement reading—"The interest of this policy is now vested in John Doe and not as heretofore," will, if the policy covers stock or contents line, treat the line as a new one.

CHANNEL IRON—Bar iron rolled in such shape that it forms a channel, generally with two sides at right angles to a third connecting them.

CHAR is animal charcoal produced by heating bones to a fire heat in closed receptacles and then reducing to a fineness.

CHARCOAL is a solid (carbon) obtained by the destructive distillation of wood. Made by burning wood in heaps covered with turf and dirt. Small openings are left above and below so that a little air can circulate through the wood, thus continuing a smothered burning. In powdered form is liable to spontaneous combustion. Should only be stored in weather-proof houses with good ventilation. Storing in large quantities should be avoided. All oils, lights and fires should be kept away from storage buildings. "Screenings" should never be allowed to accumulate. Fires in charcoal piles are difficult to extinguish. Although all combustion has apparently ceased after the application of water, flames may again burst forth. (Norit is a sort of *charcoal.) See Animal Charcoal.*

CHAR-HOUSE—See Sugar Refineries.

CHARLOCK OIL—The product of a weed seed (wild mustard).

CHARRING is the heating of organic matter out of contact with air.

CHASERS—Sometimes called edge-runners, consist of a heavy wheel mounted on a horizontal axis which travels slowly around a circular bed, giving a crushing and mixing effect to the material placed in its path. Used in paint or chocolate factories. No hazard.

CHATTEL MORTGAGE—A lien upon personal property, stock, fixtures or machinery for money loaned. To the insurance man it is indicative of financial straits, because the insured is forced to borrow on his movable property.

CHECK VALVE—See Flap-check Valve. See Illustration, pages 636-637.

CHEMICALS should only be allowed to be stored according to municipal requirements. Colored fire in any form, flashlight powders, liquid acetylene, acetylide of copper, fulminate of mercury, fulminating gold or silver, gun cotton, nitroglycerine (except U. S. P. solution), chloride of nitrogen, amide or amine explosives, cymogen, volatile coal tar products having a boiling point below 60 deg. F., chlorate of potash in admixtures of organic matter or with phosphorus or sulphur, zinc dust, phosphorus, quicklime, phosphides, calcium carbide, metallic sodium and potassium. Dangerous chemicals should be isolated in underground vaults. Metallic sodium and potassium in contact with water reacts, releasing hydrogen, and flames result. These latter chemicals should be stored in oil. See Drugs and Chemicals.

CHEMICAL EXTINGUISHERS—See Extinguishers.

CHEMICAL FIBRE OR FIBREBOARD—It is a board-like substance ⅛ to 1/16 inch in thickness, and will not burn readily. It is especially adaptable for covering and lining trunks.

Fibreboard is made from various waste materials, such as leather clippings, flax, hemp, old rope, tow, rags, paper, wood pulp and, in fact, almost any fibrous substance. These materials are chopped or cut into very small pieces in a

cutting machine, then cooked in an agitated steam-heated boiler, in solution with lime, soda ash and an alkali, for several hours, mixed and ground in a "beater" fitted with revolving knives and agitators, similar in principle and action to that found in paper mills. Rosin, soap, coloring matter and other ingredients are then added.

From the beater the stock is run into storage tanks or stuff chests, which supply the board-making machine known as the wet machine, where it is allowed to collect uniformly on the surface of a cylinder until it is of the proper thickness. It is then removed and placed on racks to dry, either in steam-heated dry rooms or on roofs in the open.

CHEMICAL FIRE ENGINES—Are used by fire departments, railroads, hospitals and factories. Consist of a 40-45 gallon chemical tank mounted on wheels with a length of hose (similar to hand extinguishers). Pressure, 75-160 lbs. or higher. Tested hose especially built for this particular purpose. To operate it is only necessary (in some types) to turn the operating wheel at rear, which revolves the tanks. The loose lead stopper drops from the acid jar, allowing the acid to flow into the soda or other alkali, thus creating the pressure. In some types, the bottle containing the acid breaks, thereby allowing the acid to mix with the soda. The double tank carts are preferable because while one tank is doing service the other tank can be recharged, thereby saving valuable time.

CHEMICAL FIRE EXTINGUISHERS—See Extinguishers.

CHEMICAL LABORATORIES—In congested districts especially where doing experimental work, constitute severe exposures as a rule. In war times, experimenting, or manufacturing of explosives and dangerous gases predominate.

CHEMICAL RISKS—Should be written cautiously. Inspect for setting of furnaces, ovens and chimneys. Liable to be a nuisance on account of obnoxious fumes. The action of acids and corrosives on fire doors and sprinkler heads makes these devices short-lived.

CHEMICAL WAREHOUSES—Buildings where the assured agrees *to store separately* from all other merchandise,

a given list of chemicals, maintaining such separation, each from the other, by a substantial brick wall not less than 12 inches thick, extending through roof without doors or windows.

CHEMICALS IN CONTACT WITH WATER—See Water.

CHEMISTRY—A knowledge of chemistry is a great asset to an insurance inspector, for it enables him to determine fire hazards due to combination of materials which might be passed by either the assured or a less qualified inspector.

CHENILLE MACHINE—See Embroideries.

CHEWING GUM MANUFACTURING—Raw stock consists of chicle, which is usually received ready to be made up, essential oils, flour, flavoring extracts and glucose. Work consists of cooking in steam kettles, mixing the ingredients in power mixers, rolling the gum into thin sheets by steam rollers, cutting into strips, powdering and wrapping. The gum is first wrapped in waxed paper. After wrapping, the package is sealed by heating the waxed paper ends on a steam or gas-heated table, then pressing the ends together.

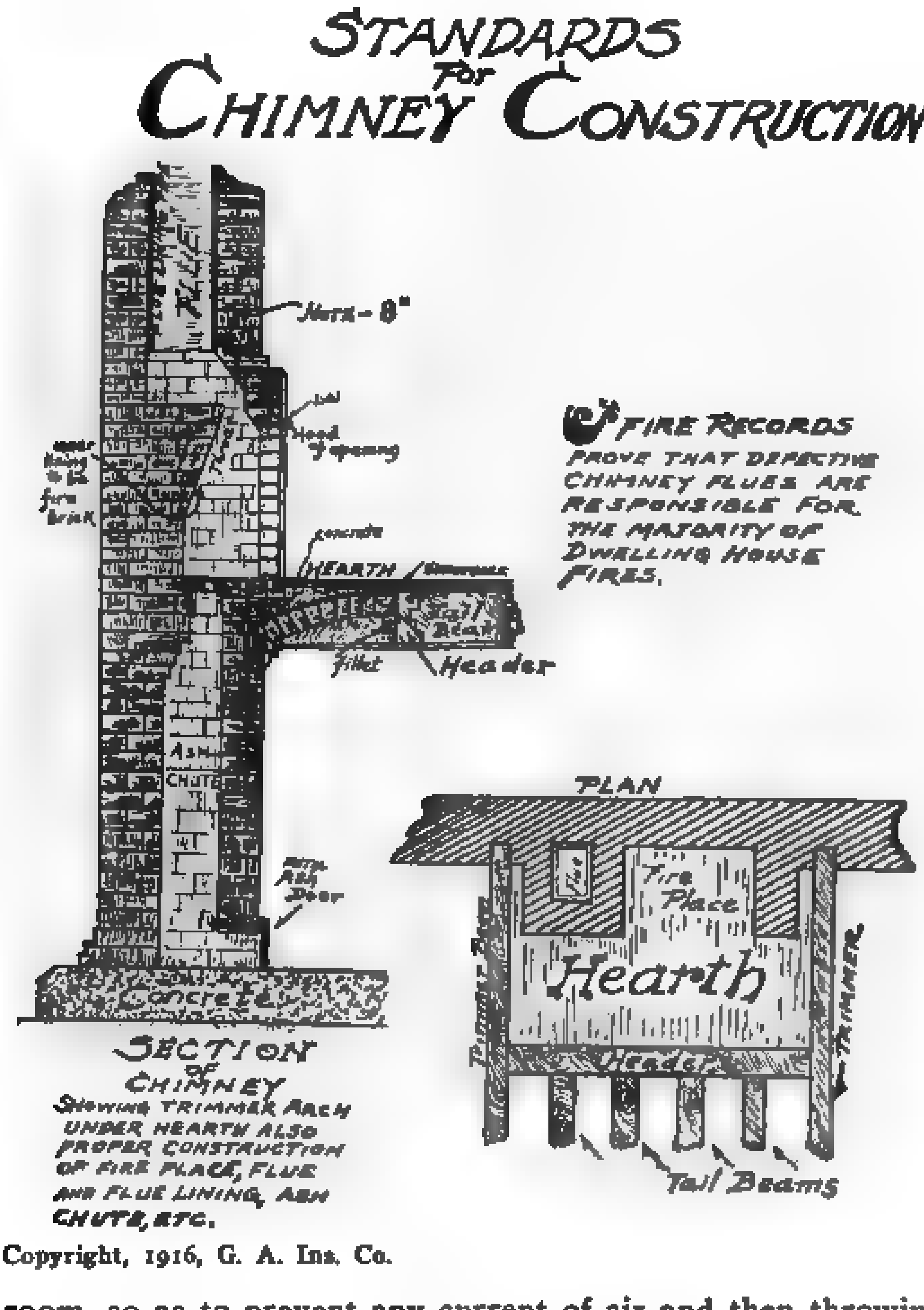
CHICLE comes in various forms, some hard and others soft, depending on locality in which it is produced. It is refined and blended for use as chewing gum. Process consists of breaking it into small bits in a "cracker," grinding in an iron grinder, mixing in steam-heated kettles, and filtering in presses. A steam process.

CHILE SALTPETRE (sodium nitrate)—See Saltpetre.

CHILLING—Giving great hardness to the outside of cast iron by pouring it into a mould made of iron instead of wood.

CHIMNEY (radial brick)—Built of perforated radial bricks, varying in size, and made from refractory clay of great heat resistive quality and crushing strength. Are specially baked or burned and have a series of holes in them to permit even burning. Laid up in cement mortar. The walls are reinforced with steel bands. When built, their perforations form a dead air space which prevents radiation. Better workmanship and material is required to build a radial brick chimney which adds to the safety of a plant.

CHIMNEY ON FIRE—When soot has been ignited by a fire it can be extinguished by shutting all the doors of the



room, so as to prevent any current of air and then throwing a few handfuls of common salt upon the fire in the grate or *in the stove. In burning* the salt, muriatic acid gas is

evolved, which is a prompt extinguisher of fire. See Soot Removal.

CHIMNEYS are made tall in order to maintain a large hot fire. The hot air and gases ascend the chimney at the rate of 50 to 60 feet a second, and the velocity of the ascending current is based practically on the square root of the height of the stack.

Terra-cotta tile, sewer pipe or hollow bricks are not sufficient protection by themselves. All single thickness chimneys should be lined. Chimneys on wall brackets are a source of danger due to collapse or rupture, unless the corbelling be of brick and very substantial. Woodwork should not cover surface or enter any part of a chimney. Smokepipes should enter chimneys horizontally and chimneys should be cleaned once a year.

The main cause of chimney fires is the accumulation of soot. Soot is nearly pure carbon and is easily fired by sparks from a wood fire. If damp, will smoulder for hours and is liable to ignite spontaneously. Fires are sometimes caused by the house settling, and the weight of the wall resting on the chimney causes the bricks to loosen, leaving cracks which afford a means of sparks communicating to woodwork.

After large and extensive explosions, all chimneys within the shock area should be examined. (Lesson learned at Morgan, N. J., explosion.) See Explosions. See Bracket Chimney; also Wall Chimney.

CHINA DECORATING OR DECALCAMANIE—China is first sized with a varnish, part resin and part turps, by hand brush. Design is then pasted on, pressed and washed by hand with same material, then baked in kiln. Designs are on paper with transfer paper called decalcamanie. See Crockery.

CHINA OIL SILK—As a stock is very inflammable and susceptible. Used for raincoats. Apparently use paraffine for impregnating fabric.

CHINATOWN DWELLINGS—Fires are caused and spread by swinging gas brackets igniting walls covered with *Chinese decorations,* such as festooned paper, knick-knacks,

ornamental wood objects and prints. Unsafe stoves are also found.

CHINA WOOD OIL—Also known as Tung Oil. Used by varnishers on woodwork; obtained from Chinese nut or berry. Used as a substitute for linseed oil. Inflammable. Subject to spontaneous combustion.

CHINESE RESTAURANTS are seldom insured on account of their fire record. They are cleaner than the general run of restaurants. Very little frying is done, which reduces the grease fire hazard.

CHINESE WAX—Is a solid deposited by insects on the Chinese ash tree. Melting point 181 deg. F.

CHIROPODISTS—Usually occupy small rooms on an upper floor. May have unsafe gas stove. Alcohol is used extensively. Salves may be made on premises, introducing the hazard of direct heat. Some corn lotions are made of ichthyolated collodion containing 63 per cent ether, 20 per cent alcohol. Good fire risks. See Corn Cure.

CHLORANILINE—Aniline mixed with chlorine. Explosive.

CHLORATE OF POTASH—When being ground, powdered or warmed or mixed with organic substances often explodes. An oxygen carrier. Used in making explosives, dyes and matches.

CHLORATES, NITRATES, PEROXIDES—These are all hazardous, owing to the quantity of oxygen which they evolve when heated. Most of them can be detonated or exploded when in contact with starch, sugar, gum, sweepings, dust, sulphur and its compounds or other organic matter. Are apt to cause explosion by friction, concussion or high temperature, and should be kept away from mineral acids, carriers of oxygen, organic substances and sulphur. (W. D. Grier in Crosby-Fiske Handbook of Fire Protection.)

CHLORATE TABLETS contain potassium chlorate, Same hazard as other chlorates in bulk.

CHLOR-BENZOL—Flash point about 90 deg. F.

CHLORIDE OF CALCIUM is muriate of lime.

CHLORIDE OF LIME is made by passing chlorine gas

into boxes of lead in which a quantity of slaked lime is laid on shelves. Called bleaching powder.

CHLORIDE OF NITROGEN—A very dangerous compound, made by leading chlorine into warm sal ammoniac.

CHLORIDE OF PHOSPHORUS, phosphorus trichloride, is a fuming colorless liquid. Acts strongly on organic matter generating great heat.

CHLORIDE OF POTASH LOZENGES are highly dangerous if accidentally brought into contact with an unlighted phosphorus match.

CLORIDE OF SILICON is a colorless liquid fuming strongly in air. Mixed with water it is decomposed, forming hydrochloric acid.

CHLORIDE OF SODA—See Chloride of Lime.

CHLORIDE OF SODIUM is common salt.

CHLORIDE OF SULPHUR (sulphur monochloride) is a corrosive fuming liquid used as solvent for rubber in vulcanizing. Generates intense heat when mixed with water.

CHLORIDE OF ZINC—When in fused state gives off considerable heat when in contact with water.

CHLORIDES—Chlorine combines with other elements to form chlorides. When it combines with a metal and oxygen, chlorates are found. When so combined it is entirely harmless. See Ide.

CHLORINE—A heavy, greenish, poisonous gas given off in some processes of manufacture and by bleaching powder and chloride of lime, especially in the presence of strong acids. It is not inflammable, but may cause fire or explosion if in contact with ammonia, turpentine or finely powdered metal. Good ventilation necessary where gas is generated. Used as a bleaching acid, supports combustion, has a strong affinity for hydrogen, but little for carbon, burns quickly giving off a white smoke. Can be made with two parts dilute sulphuric acid and a trifle more of chloride of lime or bleaching powder. See Caustic Soda, also Caustic Potash.

CHLORITES are chlorous acid compounds.

CHLOROFORM may be obtained by heating chloral with *potassium nitrate, or* by distillating a mixture of alcohol,

water and bleaching powder. Burns with a greenish flame.

CHOCOLATE is made by roasting cocoa beans and then removing the outer shell and grinding the entire bean. The ground substance is put through a process to reduce it to a pulp. Fair fire risks.

CHOKE COIL—Wire, wound in one direction, of very small resistance but large inductance. Used to reduce the voltage and throttle the flow of current without the loss of power which follows the use of resistance.

CHOKE-DAMP is chiefly carbonic acid formed after an explosion of fire damp. See After Damp.

CHORDS IN TRUSSES—The top member and the main horizontal tie are often called chords.

CHRISTMAS TREES—See Candles.

CHROMATE OF ZINC is obtained by precipitating a solution of sulphate of zinc with bichromate of potassium. Used in pigment printing.

CHROMATES—Compounds of chromic oxide with metals. Of themselves are harmless, but if treated with sulphuric acid, they ignite any organic matter present.

CHROME—Same as bichromate of potash.

CHROMES—Vandyke browns are artificially made from pigments and sometimes contain lamp black.

Chrome Green or Brunswick Green—Made of prussian blue and chrome yellow. Somewhat combustible from such causes as a rise in temperature in a dryer or friction in grinder.

Chrome Orange—When dry is very combustible.

Chrome Yellow—Made from solution of potassium chromate mixed with lead acetate or nitrate, the chrome yellow being the precipitate (called lead chromate). Sometimes acids are used. If mixed with varnish will ignite spontaneously, providing the chrome is not thoroughly mixed, which would leave air in the mixture. When the mixture is ground in a mill, there is no danger. Used in making printer's ink.

Chromic Acid—A dye used in calico printing. Also sets fire to organic matter and explodes when suffused with alcohol or *acetic acid.*

CHROMO-LITHOGRAPHY—Each color is run in separately until lithograph is completed.

CHURCHES—Of ordinary construction, have a very bad fire record. The trouble probably lies in the fact that they remain idle and without heat the greater part of the week and then the fires are forced to their capacity so as to get ready for services. Furring and concealed spaces play a large part

Courtesy of Pittsburgh Chronicle-Telegraph

A Bad Church Fire.

in spreading fires. To make the interior attractive, the walls, recesses and pipe channels are furred out to make a smooth interior, leaving in some places a concealed space of over a foot in depth. This, and the numerous hot air or ventilating pipes cause the fire to spread and soon reach the attic over the hanging ceiling and burn off the roof, which in collapsing tears down the walls and wrecks the interior. Vestments, altars and statuary are very expensive. Fixed marble work and stained glass windows are insured with the build-

ing and may form considerable of the building value. Fires have been caused from upsetting candles, defective wiring and other common causes. Rubbish is often found in concealed spaces and above hanging ceiling.

CHURCH OIL is rape oil or a combination of rape and mineral oils. Used in church rituals.

CHURN DRILL—A long iron bar with a cutting end of steel. Much used in quarrying.

CHUTE—An inclined slide, open or enclosed, used for conveying material from one level or floor to another floor level.

CIGAR BOX FACTORIES—Hazards of woodworkers but considerable fine dust and shavings are created and all planers and other important machines should have blowers attached to carry off the dust and shavings. Gas heated embossing presses are used for impressing the trade mark on boxes, as well as printing presses for printing advertising matter on boxes. Poor fire risks.

CIGAR FACTORIES—Leaf tobacco received in bales, opened, sorted, stems stripped, leaves steamed and cigars rolled by hand. Mild hazard if clean. Unless building is steam heated, large pot stoves are used. Steam box usually gas heated. Profitable risks if well established.

CIGARETTE MAKING—Inventions and improvements in modern machinery render this process principally a mechanical operation. An up-to-date plant has automatic cigarette machine with hopper holding the tobacco and attachments which grasp the required amount of tobacco, roll it, paste it, clip the ends and count the cigarettes. Cold pastes are used, although some makes of machines have a small gas flame which dries the wrapper before it leaves the machine. The cork tip machine rolls a piece of cork around the cigarette and pastes it (no heat used). Tobacco is blended in a revolving drum, enclosed in a wood frame, then moistened and dried in separate revolving cylinders. The cylinder is on an inclined axis and delivers the tobacco to the cigarette machine. "Textile" dryers, as used in woolen mills, are used for drying leaf tobacco. It consists of a very long traveling belt on which is placed the tobacco, heated by steam coils and hot air blown across steam coils, all enclosed in a wood-

en frame. Hazards in this apparatus are steam pipes, and dust collecting on fans. The tobacco is ground in an all-iron machine with knife grinder which should have magnet to catch metal particles. Cigarettes spoiled in the making are macerated in a mill, the tobacco screened out and used again. Storage of tobacco should be in a room with even temperature, to prevent deterioration. Other hazards are paper box making and printing, making flour paste in steam kettles, cleaning and dusting tobacco-drying rooms, and use of bisulphide of carbon for exterminating vermin. See Tobacco.

CINDER CONCRETE—See Concrete.

CINEMATOGRAPH—A motion picture machine.

CINNABAR—A red ore or mineral substance from which mercury is obtained.

CIRCUIT BREAKER—An electrical device, manual or automatic, for interrupting completely the flow of current in a circuit.

CIRCULAR SAW—A woodworking machine with the saw in the center of a flat table or stand.

CIROLEUM—See Flowers and Feathers.

CITY LOTS—There are seventeen city lots, 25 by 100, in an acre.

CITY MAIN OR RESERVOIR should be sufficient to give twenty-five pounds pressure at a building. A pump connected to city main should be capable of providing twenty-five pounds pressure at top line of sprinklers. See Fire Pumps.

CLAPBOARDS—Thin boards, thicker on one edge. Used for covering the walls of houses.

CLARIFYING—See Liquors.

CLAROLIN—An approved benzine substitute, classed with kerosene.

CLAY is derived from a certain kind of rock called feldspar. When feldspar is exposed to the action of the elements it crumbles slowly at the surface and the little particles combine with a certain amount of water-forming clay.

CLEANING COMPOUNDS—Usually contain gasoline or other inflammable solvents. Use same care in handling as with gasoline.

CLEANING ESTABLISHMENTS—See Dry Cleaning.

CLEANING MACHINERY FOR GRAIN—Should either be vented to the outer air, or else provided with a standard dust collecting system. Machines should be provided with magnets to catch metallic substances.

CLEARANCE—The clear space or uninterrupted distance between any heating apparatus or device to fixed woodwork or other combustible material. Temporary obstructions would not be included.

CLEAR SPACE—Stock should not be placed nearer than 2 feet from the ceiling. If placed directly under the ceiling it shuts off the possibility of hose streams reaching the goods behind the same. In the case of sprinklered risks it obstructs the proper distribution of water from sprinkler heads. See Aisles.

CLEAR SPAN—Distance between end supports. A truss supported only at ends is said to have clear span.

CLIMATE—Rates on shingle roofed buildings in the hot, dry zones of the West, six months without rain, cannot be based on the experience of shingle roofed buildings in the cold wet zones of the East, where rain once a week in summer and snow in winter make shingle roofs less hazardous. Losses (not total) on merchandise in the cold, wet zones of the East, where rain in summer adds to water damage and frost in winter encases the stocks in solid ice, force the adjuster to make "Marine loss adjustments," waiving the fire loss conditions, paying cash value of the stock at the time of the fire and shipping it, in some cases 500 miles, to a salvaging plant, where it can be thawed, dried, conditioned and sold for the insured.

CLIPPINGS—Cotton or woolen, if clean, are usually classed as desirable insurance, but inspection should always be made to determine if dirty rags or paper are received along with the clean clippings. If sorting is done, the number of hands should be noted, also whether metal receptacles are used under the screens for waste material. No gas lights should be permitted over sorting tables. Clippings in tailor shops *should be kept in metal* containers. See Rags.

CLOAKS AND SUITS—Busiest season, February to April, and June to October. See Garment Workers.

CLOSED VESSELS that have been standing in a fire should be left unopened until contents are cool, because vapors may have been generated or contents undergone partial carbonization and by admitting air an explosion may take place or spontaneous ignition follow.

CLOSETS IN SPRINKLERED RISKS should have open, wire mesh or paper-covered tops so that in case of fire the water can easily wet down the contents. Closets for storage of janitors' or porters' rags and supplies should be metal-lined or fire-proof. Only waste and rags, as usually found, are likely to cause spontaneous combustion.

CLOTHEL REFRIGERATING MACHINE—Direct expansion system using ethyl chloride for refrigerant. The latter is highly inflammable. Used in small units and at low pressure.

CLOTH SPONGING—Use high temperature live steam rolls for shrinking and steaming. The goods are examined by natural light, the cloth in bolts passing over drums or frames. This class is usually found in congested districts of the garment trade. Fair insurance.

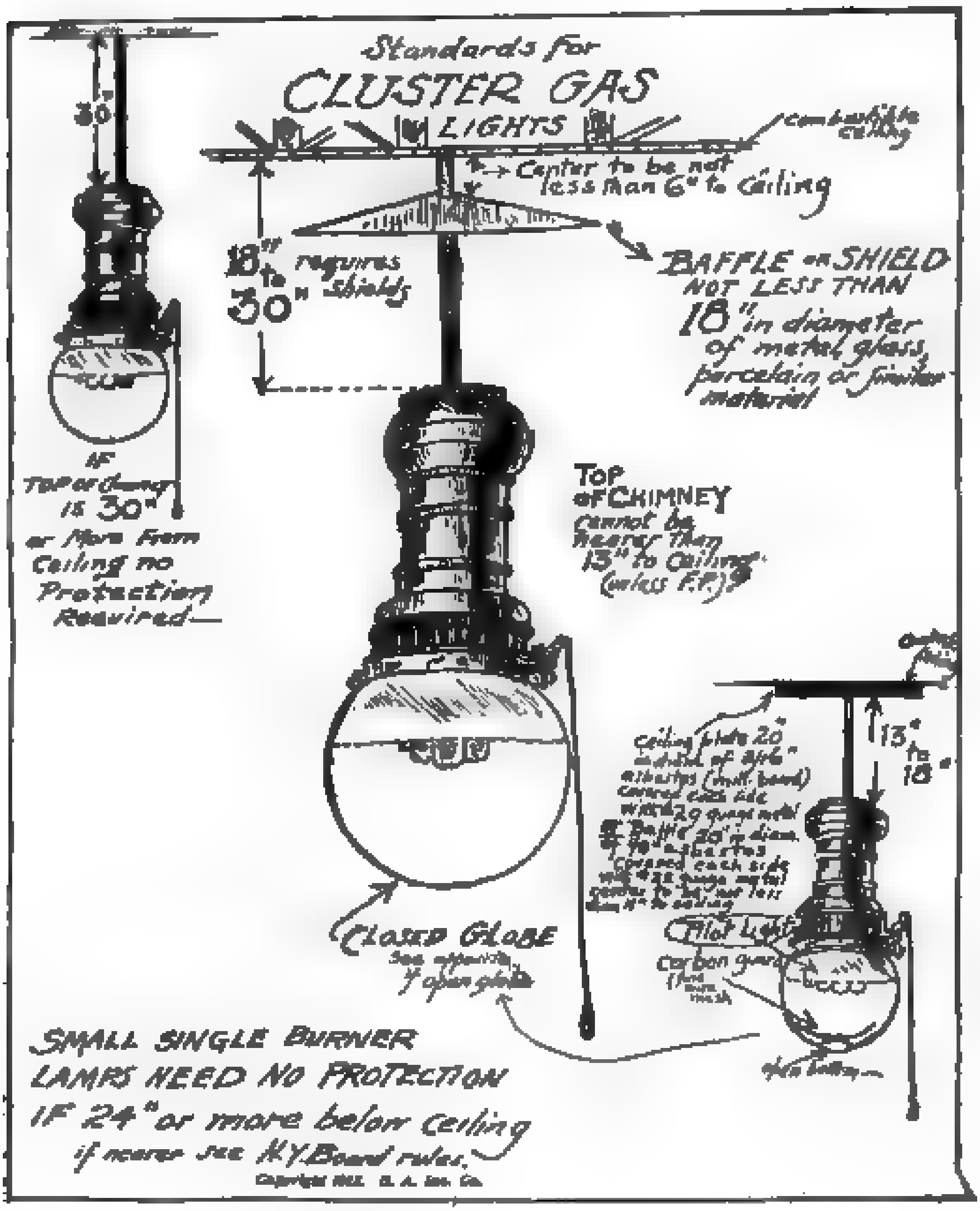
CLOTHING MANUFACTURING—See Garment-workers, also Sewing Tables. Poor fire record.

CLOTHING ON FIRE—See Fire in Person's Clothing; also Fireproofing Children's Clothing.

CLOTHING PRESSING—Many small shops now do considerable power pressing by contract. Use small, but high temperature, gas boiler for heating power-pressing machines. These gas-heated boilers are usually poorly set and near woodwork. An unattractive class. See Pressing Tables.

CLUB HOUSES—A class which should be carefully inspected before lines are bound. They may be good fire risks if well organized and in good neighborhood or they may be very undesirable, with membership of a low type and in a poor neighborhood. In the latter case buildings are generally run down and could not be used for any other purpose. Hazards are smoking, heating, lighting, untidiness *and brawls.*

CLUSTER GAS LAMPS IN FACTORIES—Should have springs to take up vibrations so that lamp will not break or become weakened. The main stem is broken with a flexible connection, made at right angles and the projecting piece supported by a spring which takes up the weight and jar. The distance from a combustible ceiling should not be less than 48 inches, unless protected with metal and asbestos shields.



COAL—Anthracite is hard coal and bituminous is soft. Lignite and peat are forms of coal in a transition state.

COAL DUST is inflammable. Brown coal and bituminous coal dusts inflame more easily than anthracite in the presence of an open flame. (See Dust Explosions.)

COAL GAS—Used for heating or illuminating; is made by the destructive distillation of bituminous (or sometimes hard) coal, in externally heated retorts; usually coke fuel is used. The gas from the retorts passes through a standpipe, the temperature being reduced by passing the gas through a water or weak ammonia liquor seal into which is dipped the standpipe. The gas is condensed around cold water pipes. The tar and ammonia are extracted by passing through a series of screens under water pressure. It is then scrubbed to separate the remaining ammonia and naphthalene by passing the gas through coke tower or through a horizontal scrubber in which are shafts to which are fastened sticks of wood which revolve in an ammonia solution. After oxide purification, it is stored in gas holders. It is lighter than air and ascends rapidly. The charging floor should be of fireproof material.

COAL GAS PRODUCERS—Pressure Systems—All pressure systems must be located in a special building or buildings approved by inspection department having jurisdiction for the purpose, at such distance from other buildings as not to constitute an exposure thereto, except that approved pressure systems without gasometer having a maximum capacity not exceeding 250 horse-power and pressure in generator not exceeding two pounds, may be located in the building, provided that the generator and all apparatus connected therewith be located in a separate fireproof room, well-ventilated to the outside of the building; every communication, if any, to be protected by an approved fire door. In all other respects the apparatus must comply with the requirements for suction systems.

Suction Systems—Approved suction gas-producers may be located inside the building, provided the apparatus for producing and preparing the gas is installed in a well-ventilated

room. At no time shall the internal pressure of the producer be in excess of atmospheric pressure.

The smoke and vent pipe shall, where practicable, be carried above the roof of the building in which the apparatus is contained, and above adjoining buildings. When buildings are too high to make this practicable the pipe shall end at least 10 feet from any wall opening.

No smoke nor vent pipe shall be within 9 inches of any woodwork or any wooden lath and plaster partition or ceiling.

Where smoke and vent pipes pass through combustible partitions they shall be guarded by galvanized iron ventilated thimbles at least 12 inches larger in diameter than the pipes, or by galvanized iron thimbles built in at least 8 inches of brickwork or other incombustible material. They shall not under any circumstance be connected into chimneys or flues, except that the pipe may pass up in flues used for no other purpose. No smoke pipe shall pass through any floor nor through a roof having wooden framework or covering.

While the plant is not in operation the connection between the generator and scrubber must be closed and the connection between the producer and vent pipe opened, so that the products of combustion can pass into the open air. This must be accomplished by means of a mechanical arrangement which will prevent one operation without the other. If illuminating or other pressure gas is used as an alternative supply, the connections must be so arranged as to make the mixture of the two gases or the use of both at the same time impossible.

If illuminating or other pressure gas is used as a supplementary supply, mixing of the two gases may be permitted if a suitable device is provided to prevent the supplemental gas from entering any part of the producer gas equipment, including the scrubber or purifier.

The opening for admitting fuel shall be provided with some charging device so that no considerable quantity of air can be admitted, or gas escape, while charging.

(Extracts from *N. F. P. A.* recommendations.)

COAL, ICE AND WOOD DEALERS usually occupy basements or cellars of tenements, and the dealers are largely a foreign element. Unsafe coal stoves, salamanders, kerosene oil lamps, swinging gas brackets and rubbish constitute the unsafe features of this class.

COAL OIL—See Kerosene.

COAL POCKETS—Motors for conveyors usually become dusty, and sometimes sparks cause explosive fires in coal dust. Steam engines and boilers should be in separate buildings. Garage and stable hazard. These buildings are usually high, shafty and open to all winds. Fire usually causes total loss.

COAL, POWDERED—Used in Portland cement rotary kilns, in boilers and brick kilns. Injected under air pressure into a flame or fire and produces intense heat. Eliminates the ash hazard as almost perfect combustion takes place.

COAL SHORTAGE—A nation-wide coal famine, such as experienced during the winter of 1917-18, greatly increases the fire hazard. In all classes of risks, dwellings, mercantile or manufacturing, tenants endeavor to relieve the situation by using improvised and often unsafe heating apparatus. Wood often replaces coal, but as it is more inflammable and produces a more intense heat, overheated smoke pipes and stoves result. Even salamanders with coal fuel are used in loft buildings and kerosene oil stoves in garages. Sprinkler equipments are rendered inoperative through freezing. In such intense weather street cleaning departments are at a standstill. The conveyances for carting refuse become frozen with wet material and cannot be used, barges become frozen and ice-bound and cannot be towed out to sea and dumped, and men will not do such work. This condition results in accumulations of refuse and rubbish and ashes in cellars. Fire departments are handicapped by frozen hydrants, icy and slippery streets or roads and physical discomforts.

COAL, SOFT—Storage should be kept, if possible, well away from the main buildings of the plant. Under no circumstances should it be piled up against a frame building.

If outside space will permit, the piles should be made

low and flat without cone effect (not higher than 12 feet) and of large area, rather than of small area and piled high.

If wet coal is received, it should be dumped around the edges of the pile, or in some location where the air can get to it freely, and where large quantities of other coal will not be packed on top of it. Spontaneous combustion hazard.

COAL STOVES should set on metal which should extend 12 inches in front of stove. Where stock is apt to come in contact with the stove, a metal shield enclosure should be provided. For installation of temporary kerosene oil burners, see Kerosene Burners. See Pot Stoves.

COAL SUPPLY—See Fuel.

COAL TAR is a black oil liquid obtained during the distillation of coal in the manufacture of coal (illuminating) gas by expelling the volatile matter from the coal and leaving coke as a residue.

COAL TAR DERIVATIVES are substances derived when coal tar is subjected to distillation. Some of the most important ones are benzene, toluene, phenol, pyridine, anthracene, naphthalene, cresol. Pitch is left as the residue. By-product ovens are now used in the manufacture of coal tar derivatives instead of the old "beehive" coke ovens of the steel plants, which permitted the gas and tar from coal to go to waste. The distilling process is hazardous.

COAL TAR DYES—See Aniline Dyes.

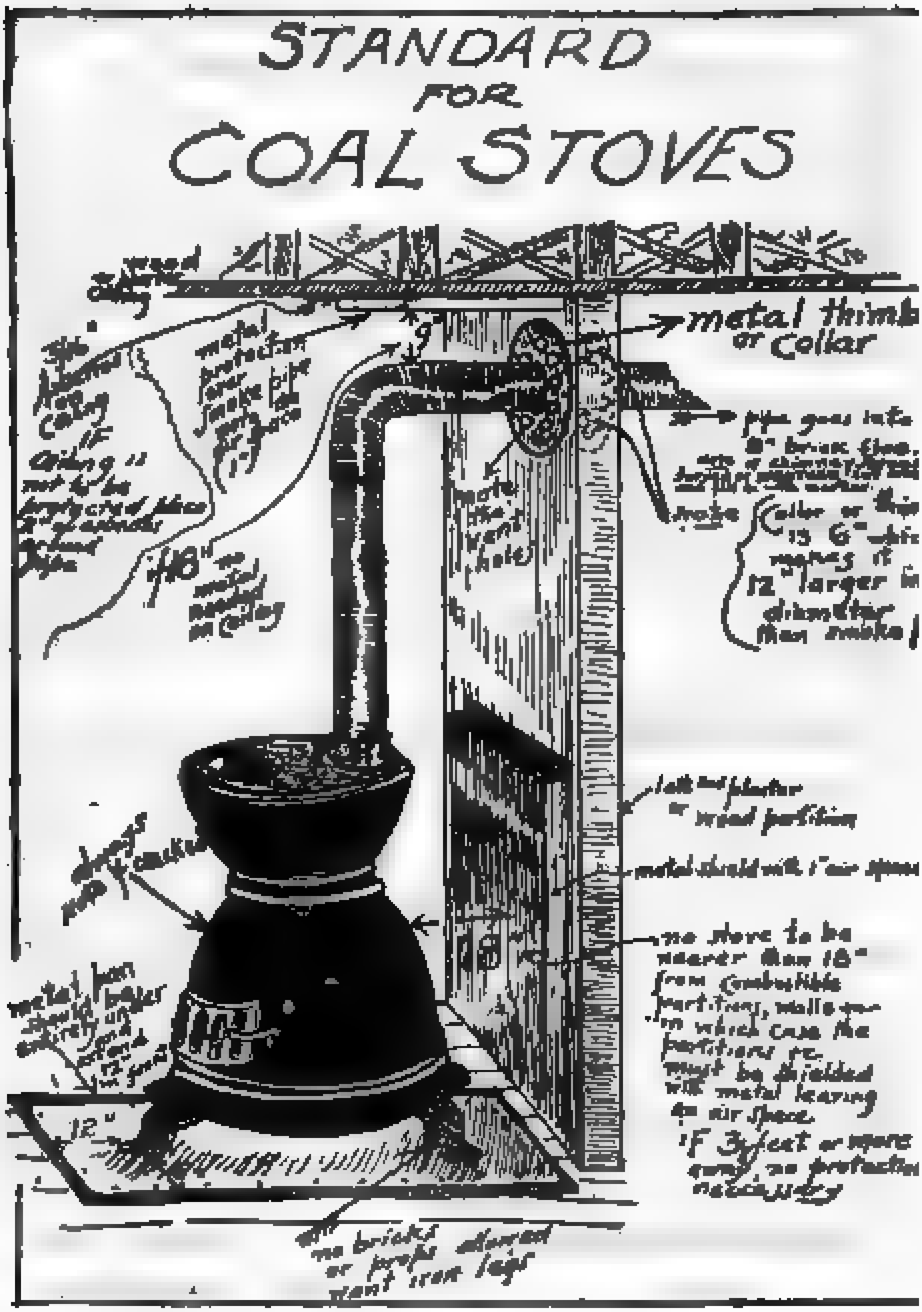
COAMING—The raised curbing surrounding a floor opening to prevent water from overflowing to a lower level. Also called curbing. See Curb.

COAT PAD MANUFACTURING—Use ordinary sewing machines and power-cutting knives. Care and storage of cotton padding is important. Usually have considerable lint around sewing machines and on floors. Not classed as desirable insurance risks.

COBALT—A tough steel gray metallic element similar to nickel. Valued for the blue pigment it forms. Has no fire hazard.

COBBLER'S WAX, lamp-black, negrosine and beeswax.

COCA-BOLA—A tropical hardwood used in making clari-



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nets, fifes and other similar instruments as a substit
African black wood.

COCAINE is a white, bitter alkaloid made from
leaves.

COCK—A kind of valve for the discharge of liquids
steam.

COCK LOFTS and roof spaces. See Frame Rows.

COCOA is made by roasting and then removing the shell from the cocoa bean, grinding and pressing, which forces all fat out of the bean, leaving a dry substance. The fat that is pressed out of the bean is called cocoa butter.

Cocoa is sometimes used in candy to replace liquid chocolate. The practice of each candy manufacturer making his own cocoa and chocolate, is gradually being discontinued, owing to the skilled labor required to obtain the desired results, and because the manufacturers are able to obtain cocoa and chocolate from large cocoa factories, practically as cheap as they can make it themselves. In this way they also eliminate the risk they have previously taken in not making the chocolate the right consistency. Good fire risks as a rule.

COCOA BUTTER—When the oil from cocoa seeds is separated from the seed itself it is turned into cocoa butter. Used in making cosmetics. See Cocoa.

COCOA-MATTING—Made from fibre which is "laid" in rope walk, balled by twisting on hand-turned balling machines, braided into strands on ordinary braiding machines, worked into matting on looms. The upper side combed and the uneven edges cut evenly with shears. Shears are iron rolls on which are sharp edges which, rapidly revolving, shear off the edges. These and the combers should have blowers to carry off the fine-cut pieces and dust. The edges of the mats are sewed on ordinary sewing machines. The mats are bleached in chloride of lime, dyed in aniline colors, then dried. Storage of large quantities of fibre, dyeing, bleaching, drying, shearing and combing are the principal hazards. (Avoid this class if possible.)

COCOANUT HAIR—Classed as a fibre. Burns slowly when in bales. The mass becomes incandescent and thoroughly charred without emitting flame.

COCOANUT OIL—Cocoanut oil was imported chiefly for the soap industry. Even today, the soap manufacturers consume the largest percentage of cocoanut oil imported or made locally.

During the *heavy war demand* for glycerine, cocoanut oil

was used extensively by the soap manufacturers because of its high glycerine content—the commercial extraction averaging about 12%. This glycerine demand will continue, to a large extent, for other uses besides explosives.

The big demand for cocoanut oil is for margarine, due to the fact that cocoanut oil has many characteristics of the butter fat. The formula mostly used for margarine is 60% cocoanut oil, 20% peanut oil and 20% milk. See Nucoline.

COCOANUT SHREDDING consist of separating the meat from the shell by machinery, shredding in attrition mills and drying the flake in "textile" dryers. Flake may be dried on steam tables or in large cylinders with wire mesh top and bottom. (Always inspect this class.)

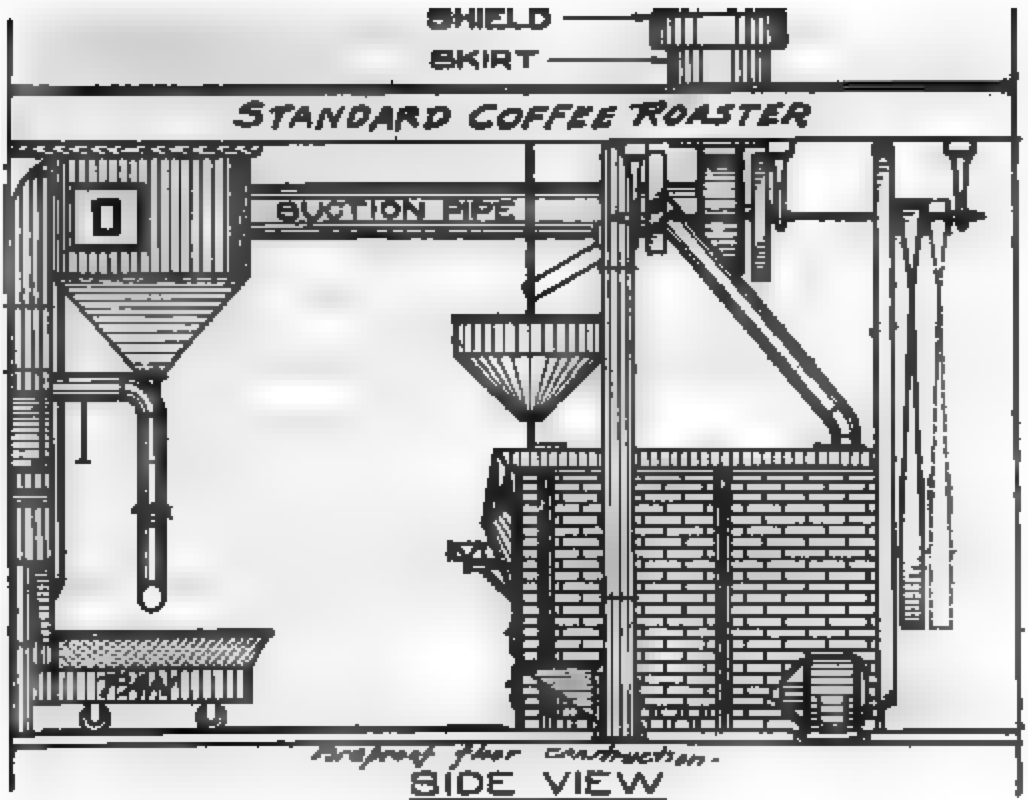
COEFFICIENT, or a constant friction, safety or strength, etc., may usually be taken to be a number which shows the proportion (or rather ratio) which friction, safety, tensile strength, etc., bear to a certain something else which is not generally expressed at the time, but which is well understood. For example: When it is said that the coefficient of friction of one body upon another is 1/10, it is understood that the friction is in the proportion of 1/10 of the pressure which produces it. A coefficient of safety of 3 means that the safety has a proportion or ratio of 3 to 1 to the theoretical breaking load.

COFFEE—A bean, the preparation of which for market involves serious hazards, namely, shelling, cleaning, and polishing by power machinery; also roasting by direct fire heat. Coffee in the bean is considered good insurance.

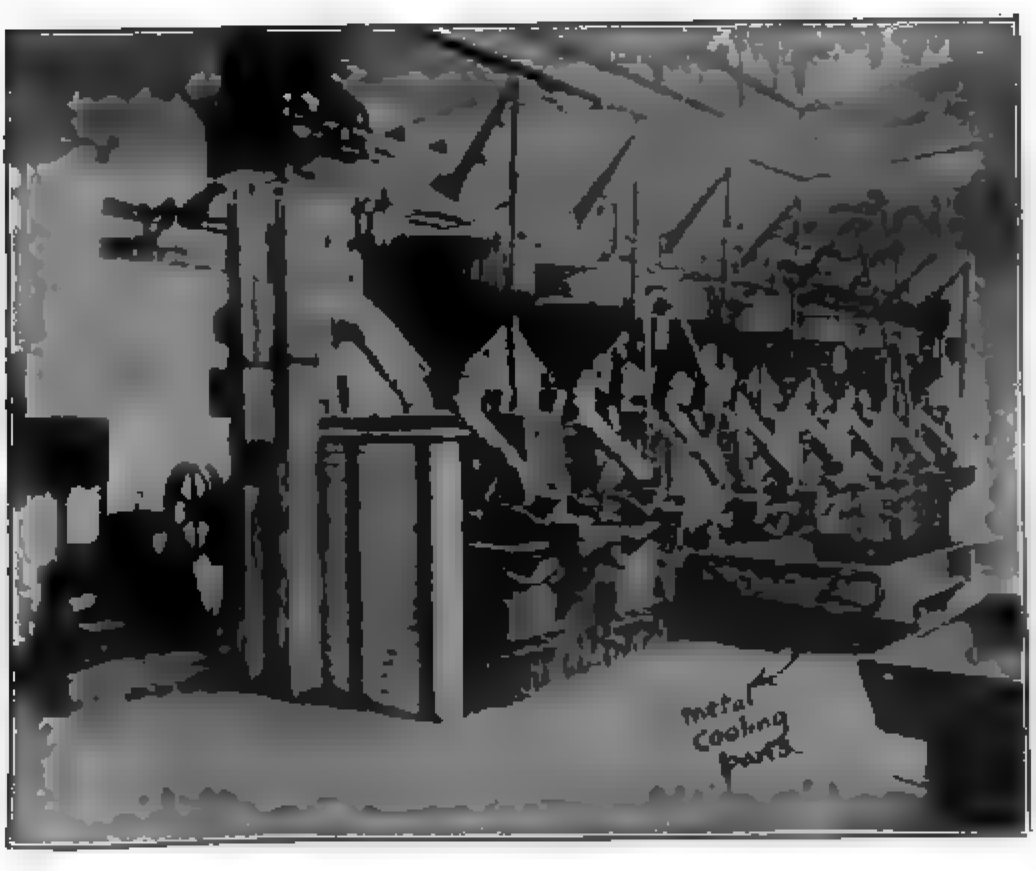
COFFEE POLISHING—The polishing machine is a stationary drum perforated with fine holes. Inside the drum are paddles operated by motor. Damp coffee and sawdust are fed to the machine from an elevated hopper. The revolving paddles polish the coffee, and the dirt and sawdust sift through the perforations. The coffee is then bagged.

COFFEE AND TEA STORES—Note whether the bulk of stock is in metal containers well covered, also the setting of the small coffee roaster and how the packing material is kept.

COFFEE ROASTING processes consist of shelling, *cleaning, roasting,* polishing, cooling and bagging. Inspectors



all metal equipment, i.e. metal cooling pans, troughs and conveyors.



Motor driven "Burns" coffee roaster.

should carefully examine construction of roasters and also describe the setting, whether fireproof or non-fireproof floor and kind of ceiling over the roaster.

The blowers attached to the cooling pans should be vented to the outer air. Fair insurance risks.

COFFEE WAREHOUSE—At a recent fire in a paint and oil risk adjoining a coffee warehouse, pungent fumes from the burning paint and oil poured into the coffee warehouse. Although no fire or water entered the warehouse, a large loss was paid on coffee. See Exposures.

COFFER-DAM—An enclosure built in the water and then pumped dry so as to permit masonry or other work to be carried on inside of it.

COFFINS—Manufacturing presents carpenter shop hazard, cotton and excelsior for stuffing, gluing, sewing machines, painting and varnishing and metal working. Fires in this class usually very severe, owing to the highly varnished stock of a combustible nature.

CO-INSURANCE—See Average Clause.

COIR—A sort of yarn derived from the husks of cocoanuts.

COKE is the solid material left after evaporating the volatile ingredients of coal by means of the destructive distillation of coal in closed retorts. Used in the manufacture of iron and steel.

COKE OIL—See Pitch Coke.

COLD AIR BOXES of furnaces should be metal rather than of wood. If metal for a distance of 8 feet from the furnace, the wood is not a very serious feature.

COLD STORAGE—An atmosphere maintained below freezing for the preservation of meat, etc., which are apt to putrefy. The production of cold is accomplished either by direct expansion or by the brine system, the latter being the more common. In direct expansion the liquefied gas is allowed to expand directly into coils or piping located inside the room to be cooled, or air is blown over these coils and circulated to a number of chill rooms. In the brine system the liquefied gas is allowed to expand into coils of piping *immersed in a tank* containing brine which thus cooled is

circulated in pipes through the chill rooms. Note.—The famous Abraham & Straus fur cold storage fire prompted the underwriters to recommend automatic dampers for air ducts, automatic "stop and controller" for blower fan and thermostatic alarms in and under ducts, said circuit closers or thermostats should operate at a low temperature. Test of sprinklers in cold storage see Dry Pipe Sprinklers. See Bunker Rooms.

COLD STORAGE FIRES require tons of water, that is, enough to thoroughly drench the entire mass. A small amount really assists the fire.

In New York City a firm recently converted a fireproof cold storage building of a brewery into fur cold storage, estimating that as much as ten millions of dollars worth of furs could be stored therein. The owners of the furs preferred that the building be not sprinklered, because the water damage would ruin the stock. Fires have been known to expand the cold air pipes to such an extent as to burst the walls of the building. See Ammonia Gas; also Consequential Loss.

COLD WEATHER LINES—See Sprinklers.

COLLAR BEAM—A horizontal beam below the apex of the roof, stretching between every alternate pair of rafters which meet at the top.

COLLAR, CUFF AND SHIRT FACTORIES—Hazards are those of white goods manufacturing, such as cutting, shrinking and sewing. Clothing is shrunk in steam rooms. Laundering, small press for printing maker's name on goods, dry rooms, collar-shaping machines, and other machinery same as used in collar and cuff laundries. Incidental hazards are paper box making, wood box making and machine repair shop. See Laundries.

COLLAR SUPPORTERS—Used by women for supporting lace collars. Made of wire, cut and crimped, immersed in dilute muriatic acid and water, washed in water dipped in solution of cyanide of potassium and water as a galvanic process. Dipped into paint, dried, then coated with celluloid-enamel in dip tank. Hazards are dip process painting and coating with celluloid; turpentine used as thinner for paint,

acetone for celluloid; scrap celluloid, gas-heated drying ovens and open lights near liquid celluloid. Poor fire record class.

COLLEGES—See Academies.

COLLODION—Gun cotton dissolved in alcohol and ether. Used in photo-engraving and wet plate photography. Very inflammable. Vapor is explosive when mixed with air. Open flames or lights prohibited. Flash point 40 deg. F.

COLLODION COTTON—A sort of gun cotton but contains less nitrogen.

COLOGNE SPIRITS—See Alcohol (ethyl or grain).

COLONIAL WALL BOARDS—A product of calcined gypsum, fibred with wood and containing small percentage of Portland cement and hydrated lime formed into 32 or 36 inch slabs or sheets.

COLOPHENE—A sort of turpentine. Inflammable.

COLOR PRINTING—Lithographing hazard.

COLOR WORKS—Colors made by precipitation. Materials such as sulphuric, muriatic and fortis acids, mineral salts, copperas, zinc white, cyanide of potassium, chloride of potash, bichromate of lime, nitrate of soda, and soda ash are placed in dissolving vats, then drained to settling tanks where water is pumped out. Liquid colors are pumped to filters, placed on trays and dried in dry rooms. They are ground in mills and pulverized, sifted and packed. The fire record is poor. See Aniline Colors.

COLORED FIRE or tableau usually contains chlorate and a salt, the metal part of which has the property of giving color to the flame. Strontium in the form of nitrate gives a red flame. Calcium produces a purple flame. Highly inflammable.

COLUMBIAN SPIRITS—See Wood Alcohol. Flash point 44 deg. F.

COLUMN—Sometimes called a post. A pillar, built up of steel members or other appropriate material.

COLZA OIL is rape oil. It is used in the manufacture of candles.

COMBINATION RED FIRE ALARM BOX—Used for watchman to record his hourly rounds. If watchman fails to record a certain round, a man from the central station is

despatched to ascertain the cause of delay. The same box is used for sending in a fire alarm.

COMBS—See Celluloid.

COMBUSTIBLE SUBSTANCES are elements or compounds which possess a strong affinity for oxygen.

COMBUSTION—What we usually call combustion attends the union of oxygen with some other substance, either solid or gaseous, as with carbon and hydrogen. We generally only use the term combustion when it is accompanied by heat and light, and yet the union of oxygen with other things often takes place without producing any light. This is when the union takes place slowly—thus iron rusts, the oxygen of the air unites with it, but so slowly that no light is given out—there is heat, but so little of it that it cannot be felt because the union is so slow. It is very slow fire. When a man paints his iron fence to keep it from rusting, he really keeps it from getting burned. In this same manner, water puts out fire. It shuts out the oxygen of the air from the burning substance. It acts much as the paint acts on the iron. See Water Puts Out Fire, How.

COMBUSTION ENGINES—See Gas, Gasoline, Kerosene; also Oil Engines.

COMMERCIAL PHOTOGRAPHY—Use collodion in wet plate photography, which is occasionally mixed on the premises. Poor fire record class.

COMMERCIAL REPORTS—Reports from bureaus as to the financial standing of individuals or firms. See Trade Reports.

COMMISSION CLAUSE—Covers the property of the insured and his interest in the property of others, such as advances and storage charges. The words "held in trust" have in some cases been given a very liberal interpretation by the courts.

COMMISSION MERCHANT—One who sells merchandise on a commission basis.

COMMISSIONS AND/OR PROFITS insurance indemnifies for loss of profit or commission on merchandise or manufactured goods. There are two kinds of forms (per diem and *percentage).* See Profit Insurance.

COMMON CARRIERS INSURANCE—This insurance is to indemnify the insured for their legal liability, if any, to the amount they are obliged to pay on such merchandise in their care by reason of loss or damage by fire.

COMMON HAZARD means carelessness, unsafe chimneys, ashes in wood receptacles and the hazards of light, heat and power, as found in all risks. See Hazard.

COMMON RAFTERS—See Jack Rafters.

COMMUNICATION—An opening from one building to another, directly or indirectly by an enclosed passageway. A standard communication requires an automatic "labelled" fire door on each side of the wall. See Cut-off.

COMMUNICATION BY COMPLETED SUBWAY should be cut off by fire walls with all openings in the wall protected by fire doors and all show windows in subway stations should be cut off by fire walls from the stores back of them and be equipped with automatic sprinklers.

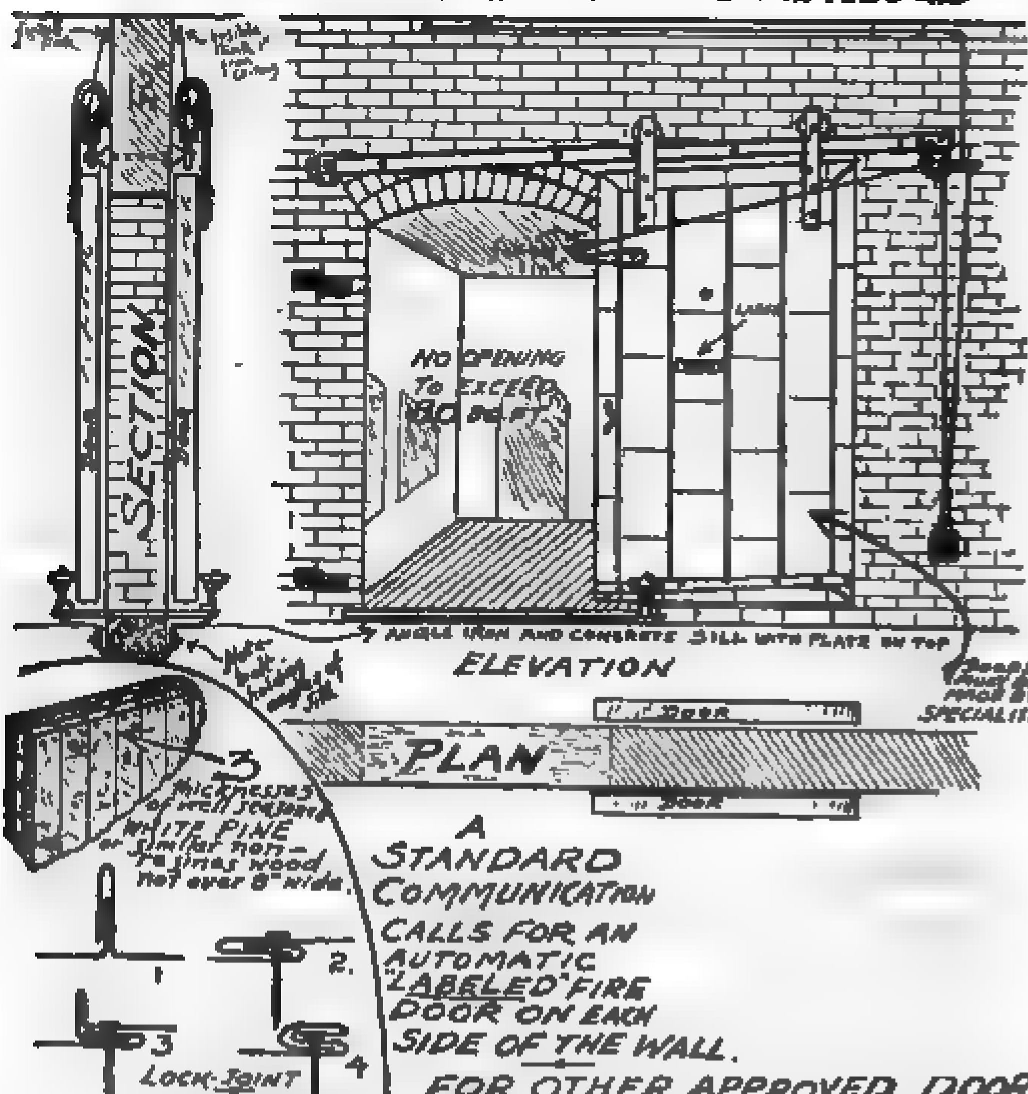
COMMUNICATION BY SUBWAY IN COURSE OF CONSTRUCTION—When sub-basements or basements of buildings have been broken into by subway excavations the communication should be cut off at the building line by a well built wall of 6-inch terra cotta or 4-inch reinforced concrete. Where in a non-fireproof building the wall must be set inside the building line the ceilings should be 4-inch reinforced concrete. In cases where there is but one story below grade a substantial 4-inch brick wall would be acceptable. Openings through the wall, if any, should be protected by labelled fire doors at least one side of wall.

COMPANY'S OPTIONS—According to the New York Standard Policy, it shall be optional with the Company to take all, or any part, of the articles at the agreed or appraised value, and also to repair, rebuild, or replace the property lost or damaged with other of like kind and quality within a reasonable time, on giving notice of its intention so to do within thirty days after the receipt of the proof of loss herein required.

COMPOSING (in printing risks) is merely setting up type by hand (no hazard).

***COMPOSITION* FLOORINGS** are composed of differ-

STANDARDS FOR COMMUNICATION OPENINGS



ent mixtures containing such materials as asbestos, magnesite, sawdust, sand, magnesium chloride, etc., and are sold under such names as Alignum, Asbestolith, Asbestos Granite, Rex, Sanita, Monolith, etc. See Flooring (composition).

COMPO-BOARD FACTORIES—The lumber is dried and

reduced to slats about a quarter inch thick. These slats are then laid flat and indiscriminately as to grain, after which straw-board is glued on either side so as to form a large flat board. Sometimes the straw-board is treated with a cement or composition of resin, whiting and wax to harden and render it water-proof. The hazards are those of woodworking risks. See Fireboard.

COMPOUND (chemically) refers to a substance containing two or more elements chemically united in such a way that the properties of the compound substance bear no resemblance to those of any of its constituents.

COMPOUND—An expression used by underwriters to indicate a risk having many manufacturing hazards under one roof, usually those of a loft building.

COMPOUNDING—See Liquors.

COMPRESSED GASES must not be stored where exposed to the rays of the sun or any heated body. All gases are subject to the law that pressure increases uniformly with the temperature where the volume remains the same; can readily occasion a violent explosion.

COMPRESSION AND TENSION—If two opposite forces are simultaneously imparted to a body in the same straight line the stress is either compressive (when the forces act towards each other) or tensile (when they act from each other).

COMPRESSION SYSTEM—See Refrigerating.

COMPRESSIVE STRESS tends to push the particles closer together.

COMPROMISE "MILL"—A term used to express the construction of a building which is below the standard of "mill construction" and above the ordinary construction. The timbers are of smaller dimensions than mill and the spans are of less distance apart.

CONCRETE is a mixture of Portland cement, sand and stone or cinders. In the Edison Phonograph Co. fire at West Orange, N. J., in 1916, the concrete buildings showed superiority over all other forms of fireproof construction. Concrete partially injured by fire may set again and become hard, if there is a gradual cooling off of the surface and

if no water is applied; but this result cannot always be relied upon.

CONCRETE, CINDER—An excellent fire resistive material for floor arches in fireproof construction, providing the cinders are of uniform size, free from dirt and refuse and contain not more than 15 per cent of unburned coal. For good work the cinders should be ground before the other ingredients (sand and cement) are added.

CONCRETE-COVERED FLOORS—Numerous fires have occurred under dry kilns and hotel or restaurant ranges which have been built on concrete laid on wood floors without air space, even though the concrete was three to twelve inches thick. The continuous heat slowly reduces the wood to charcoal and produces spontaneous combustion at a low temperature. The same principle applies to the flooring around anvils and forges due to the continuous dropping of hot iron on the wood floor.

CONCRETE FOR CELLAR FLOORS—Composed of one part of good domestic cement, one part clean, sharp, gritty sand and five parts of best clean, coarse gravel, thoroughly washed, or clean, broken stone (small enough to pass through a 2-inch ring), the latter preferably. All to be by measure, thoroughly mixed and water then added.

CONCRETE, REINFORCED—Reinforcement consists of plain bars, bars with lugs, twisted bars, those having fins or protrusions, woven wire fabric, expanded metal, perforated sheet metal. Aggregates used are rock, stone, gravel, cinders, broken bricks or tile, and slag. Buildings are erected in various types of construction, columns of concrete, walls or floor arches of concrete, or combinations of terra-cotta arches, curtain walls, etc., with concrete supporting members, or all concrete. Buildings of this latter character are rigid, sanitary, durable, fireproof. They have disadvantages, such as faulty design resulting in collapse or cannot be used for intended purposes, careless workmanship resulting in inferior construction; dishonesty on part of contractor resulting in small percentage of cement and therefore weakening of structure; expensive to alter, owing to solidity of material when once hardened; floors and walls apt to become "dusty"

due to drying of concrete which has too small a percentage of cement as binder and too much sand, or materials of poor quality or not thoroughly mixed. Building collapses or failures are due to removal of forms too quickly before the concrete has set properly, frozen concrete, overloading new structures or electrolysis.

CONCRETE TANKS for storage of fuel oil should be buried so that the top is at least 3 feet under ground and below any fill pipes and all fill pipes should enter at the top. The roof to be of iron, concrete or other suitable material, the floors and walls to be eight inches thick. The entire inner surface should be trowelled smooth. A vent pipe, with goose neck and fine wire screen openings, should extend 12 feet above ground and not nearer than 3 feet horizontally to windows or other openings to a building. Tanks should not set so that surface water can drain toward the tank and when in "batteries" should not set one higher than the other.

CONDENSATION—A process of distilling or boiling of water or mashes, and collecting and condensing the steam which passes over leaving impurities.

CONDENSER—An apparatus for changing vapor into liquid, usually a series of iron coils, cooled by running cold water.

CONDENSER, STEAM—A part of a steam plant in which the steam, after doing its work by expansion in the cylinders, is condensed by coming in contact with a jet of cold water or with the outer surface of tubes in which cold water circulates.

CONDUCTION—Property of matter controlling the rate of transmission of heat, i. e., if a bar of iron is heated at one end, the heat will be conducted rapidly to the other end, whereas a rod of glass can be heated to melting point without the opposite end becoming heated.

CONDUIT, RIGID—Sometimes known as either galvanic duct and loricated. A rigid steel pipe chemically treated for the express purpose of providing a concealed method of running electric wires from place to place and so confining

these wires as to prevent any fire resulting from short circuits.

CONDUIT SYSTEMS of electric wiring are far superior to open work, for the reason that the wires are better protected against mechanical injury and also because novices cannot very easily tamper or alter the installation.

CONES AND WAFERS—Made of flour, lard and sugar, mixed and baked. Machinery consists of gas-heated moulds, revolving automatic bakers and lard heaters. Poor fire record. See Wafers and Cones.

CONFECTIONERS—Have motor or gas engine or boiler for power for ice-cream machine and ice cracker. Gas stoves and gas candy warmers used in candy manufacturing should be properly protected. Good insurance.

CONFECTIONERS' STOVE—A round iron or sheet metal stove with open or removable top to accommodate large kettles. Gas, coal or charcoal may be used as fuel.

CONFETTI is made of paper. The sheet paper is run through a perforator. The process is not hazardous, but the premises are usually filled with loose waste paper, presenting a very untidy appearance. Cheap labor employed.

CONFLAGRATION BLAST—If you light a match the flame will mount just so high. Light a second and a third match, hold them beside the first and the flame will mount successively higher. Blow gently upon the flame and it will have a steady striking range of an inch or more. Now, if you have a quarter mile of buildings all afire at once, the uniting flame from them will reach to a height corresponding to the area of the fire, and correspondingly great must be its striking range. In San Francisco in the language of one of the official reports: "Until the wind arose the heated column reached almost half a mile in height." (Arthur E. McFarlane.) See Flames; also Temperature.

CONFLAGRATION BREEDERS (remedy for)—First, that owners of existing buildings (defectively constructed), which are so located as to form conflagration areas, be required to suitably protect roof, floors, party walls, and exposed openings. Second, that automatic sprinkler equipment with outside *siamese hose connections* and controlling valve

This sketch represents a fire caused by invisible heat, as shown in the candle sketch above, and also by flying brands lighting on the shingle roof in the distance.

near the main in the street be required in all buildings which by reason of their size, construction or occupancy, singly or combined, might act as conflagration breeders. (National Board of Fire Underwriters.)

CONFLAGRATION HEAT—Ranges from 1800 to 2500 degrees F.

CONFLAGRATION PROBLEM—Extracts from address by Franklin H. Wentworth, Secretary, National Fire Protection Association, before the Newark Association of Credit Men:

There is a way to solve this conflagration problem—not absolutely, but at least relatively. You cannot be expected to tear down your city and rebuild it of fire-resisting material; or even to tear down enough buildings to allow broad streets or parkways—by which open spaces, conflagrations might be arrested. The cities must be protected as they stand. What then can be done by you besides furnishing water supplies and fire departments; keeping your city free from rubbish, and prohibiting forever and always the shingle roof as if it were a public crime? I would suggest this plan: In the heart of nearly every city there are streets crossing at right angles, along which for a very considerable distance are buildings of brick, stone or concrete. Looked at upon the map this shows a more or less complete Maltese cross of buildings which are not wooden, and which operate to divide the wooden-built district into quarter sections, and which might hold a fire in any one of these sections if they were equipped to do so. These brick and stone buildings are ordinarily valueless as firestops, because their windows are of thin glass and their window-frames of wood. At Chelsea the conflagration attacked such buildings easily, breaking out the panes, consuming the frames and converting every story of these brick structures into horizontal flues full of combustible contents. Brick and stone buildings are logical and capable firestops if the fire can be kept out of them. If you will trace out your Maltese cross of such buildings and equip them with hollow metal window-frames and wired glass, you will immediately possess the equivalent of substantial *fire walls crossing* at right angles in the centre of

your city, dividing it into four sections. By such a simple, inexpensive, but yet strategic procedure you may be able to save your city from destruction which now awaits only the right kind of a fire on the right kind of a night.

The prohibition of the shingle roof, which is now generally recognized as a conflagration breeder, is today almost universal within city fire limits, and from the more enlightened communities it is excluded altogether. Burning shingles can be carried great distances by the wind or draught of a conflagration, and when they may alight in their turn upon other dry shingles they play fearful havoc.

CONFLAGRATIONS—Double fire engine companies are valuable in congested sections, the second company being available for second alarms or as a reserve to answer calls to simultaneous fires in the same district, thus rendering unnecessary the calling of apparatus from other districts.

CONGOLEUM is a form of linoleum in which a composition is used in place of cork.

CONIINE—A volatile and inflammable liquid alkaloid.

CONNECTING ROD—A piece which connects a crank with something which moves or to which it gives motion.

CONRON REVOLVING DISTRIBUTOR SYSTEM—This system is designed to be used as a dry line sprinkler system with heads of a special type (Conron) which revolve and make a greater water discharge than an ordinary sprinkler head. An ordinary sprinkler head can be used if desired. The water is held back from the dry line by a mechanical valve. Paralleling the pipe lines, there is an Aero Alarm System. When a fire occurs the sprinkler head opens, the automatic alarm operates, makes a report to a Central Station, also opens an electrical circuit connected to a magnet which holds a lever in place. The effect of opening this electrical circuit kills the magnet, allowing the lever to drop. Attached to this lever there is a chain which holds open the valve. When the lever drops the chain is released and valve opens permitting water to leave open sprinkler.

CONSEQUENTIAL DAMAGE TO GARMENTS—The following is the copy of a form: It is further understood and *agreed that this policy* also covers the CONSEQUENTIAL

DAMAGE to garments involved in any loss or damage by fire, or lightning at the above location, the component parts of which (Coat, Vest or Pants) may be so damaged or destroyed as to prevent the assured from selling the undamaged portion at the full or regular selling price. In that event, this Company will be liable to the assured for the actual cost price of the undamaged portion of all parts of garments so damaged or destroyed, upon surrender of the same to this Company, and the assured agrees that it will endeavor on its part to replace within fifteen (15) days after the date of such fire or fires if possible such damaged or destroyed parts of garments. Underwriters endeavor to avoid this coverage.

CONSEQUENTIAL LOSS IN COLD STORAGE RISKS—According to some underwriters' bureau, if a cold storage building contains a source of refrigeration, no clause is necessary on the policies assuming consequential loss and no additional charge is made in the rating. If the source of refrigeration is derived from the outside, the policies must either include or exclude the consequential loss by the use of the following clauses:

Clause No. 1 excludes the consequential loss.

Clause No. 2 includes the consequential loss with an additional permit charge.

The insurance companies in order to avoid payment for a consequential loss occasioned through partial or total disablement of a refrigerating plant (except when same is located in the insured building) demand clause No. 1 on the policy. If it is desired to cover against consequential loss, clause No. 2 is attached and the premium advanced.

Up-to-date refrigeration plants should have "duplicate" refrigeration systems. Not long ago a fire broke out in the cold storage stores, 2286-2298 Twelfth Avenue, New York City, which are equipped with a duplicate refrigeration system. Only a very slight consequential loss was sustained owing to the temperatures rising from 33 degrees F. to 51 degrees F. The damage was greatest in the basement refrigerators, due to the presence of the water on the floor, which quickly

absorbed the cold air in the rooms, while on the upper floors very little damage resulted, owing to the frost on the piping and the insulation of the refrigerator walls, floors and ceilings maintaining a sufficiently low temperature to prevent serious damage until the auxiliary plant was put in operation.

In the fire of the Merchants Refrigerator Co., 99-109 Tenth Avenue, New York City, on May 7th, 1918, the refrigerating apparatus was out of commission for 5 days without any appreciable lowering of the temperature (actual drop was one degree) and no stock was spoiled. See Cold Storage.

CONSIGNEE—One to whom goods are sent.

CONSIGNMENT—Goods sent to an agent to be sold.

CONSIGNOR—One who sends goods to another.

CONSTANTINOPLE, a city characterized by uncleanliness, the apotheosis of filth, the most fire-stricken city of the world, has burned down ten times since 1792. It seems unnecessary to state that over 50 per cent of all fires are caused by untidiness coupled with carelessness.

CONSTRUCTION—The difference between a frame building and one of ordinary brick is the walls. The difference between a brick building and one of fireproof construction is the floors.

CONTINGENT LIABILITY—In New York City if a frame building is damaged more than one-half of the value, exclusive of foundations, the building cannot be repaired or rebuilt but must be torn down. To offset this, policies can be written to include liability for loss occasioned by the operation of ordinances or laws requiring the replacement of entire buildings in case of fire damage exceeding a given percentage of value, the rate on such buildings being double the regular fire rate. The endorsement should read: "It is understood and agreed that the fire limit laws is one of the hazards insured against loss." See Tax Lien Interests.

CONTOUR, to follow closely, as for example, covering the beams of a floor so completely as to cover all accessible parts of the beam. Metal or asbestos is generally *used.*

CONTRACTORS (Clothing)—A name given to the owner of clothing manufacturing establishments who do work under contract. The goods to be sewed and pressed or otherwise made up, are sent to the shops in bundles already cut. The premises are usually very untidy with rubbish and many unsafe features are found such as cracked pot stoves, uncaged and swinging gas brackets, unsafe gas irons, and unsafe gas-heated boilers used in connection with pressing boards. The type of employees is not of the best, and "No smoking" rules are seldom enforced. Most companies do not write this class except as "Goods in Hands of." There is a wide difference between contract clothing shops and regular clothing manufacturers who do all the work for themselves. See Sweatshops. See Garment Workers.

CONTRACTORS—Subway, tunnel or other underground work, usually occupy light temporary frame structures with makeshift heating and lighting arrangements. Workmen have rooms where they smoke and have wooden lockers for their clothing. These risks sometimes have power plants with air compressors, large motors, switchboards, transformers, machine shops, oil and gasoline storage sheds. Fire on January 28th, 1917, of the Degnon Contracting Company, at 59th Street and 5th Avenue, New York, was probably caused by spontaneous combustion of oily overalls in wooden lockers. Fire swept through entire plant, putting entire electrical apparatus out of commission.

CONTRACTORS' STABLES are not considered as good as ordinary stables, because they have on hand a considerable amount of shoring material, tackle, hoisting engines and paraphernalia. Employees apt to smoke and throw butts into combustible material.

CONTRIBUTION CLAUSE—There are two mortgage clauses, the full contribution mortgage clause and the non-contribution clause. The non-contribution mortgage clause is used on all policies where the insurance is in the favor of the first mortgagee, but where the interest is in a second mortgagee and this fact is known, the full contribution clause

should be put on the policy and its effect would be to contribute the amount paid for loss to the first mortgagee, until the amount of that mortgage has satisfied, and then it would operate to satisfy the claims of the second mortgagee, etc.

Where the first and second mortgagee each have a policy in their favor most companies would not require the use of the full contribution clause on the policy held in interest of the second mortgagee, because in settling a loss the interest would be cared for in that they would not pay more than the full amount of the loss incurred.

Where it is not known that the mortgagee is a second mortgagee, and the non-contribution clause has been attached, in case of loss the insurance on the building even though there were two policies with the same company, would operate to pay each mortgagee the amount of the loss based upon the amount of insurance to the value of the building with whatever percentage co-insurance clause were attached. According to this, and strictly speaking, the companies would have to pay doubly the amount of the loss on a risk and this they could be compelled to do so as to protect the different interests, but the matter is usually adjusted by the various representatives so that not more than the full amount of loss is paid.

CONVECTION is the method of conveying heat on which the heat carrying material is transported from one place to another.

CONVENTS are classed the same as boarding-schools. See Schools.

CONVERTER OF COTTON GOODS—One who buys goods in the "gray" or unfinished state and dyes or otherwise conditions them into finished goods.

COOKING AND HEATING APPARATUS (oil burning) usually have an auxiliary supply tank of about five gallons capacity. They should be ten feet from burners and have overflow pipe draining back to main supply; also a vent pipe. These equipments introduce an additional hazard, and care must be exercised in their maintenance. Only approved apparatus should be installed. Burners must have an overflow

pipe arranged to draw off any excess oil by gravity to a reservoir. No dampers to be used in smoke pipe between burner and chimney. All parts must be kept clean and the apparatus not used when not in proper order. Unless installed rigidly in a fixed place the handling is apt to loosen joints and fittings.

COOLER OR COLD STORAGE—Term used to designate temperatures within the range of 29 degrees F. and 35 degrees F.

COOPERAGES are shops for assembling staves, hoops, heads and bottoms, producing barrels and pails. Regular wood-working hazard; also use direct fire heat, or in some cases steam for bending, shaping and setting the parts. This class should be written cautiously. Second-hand (recoopering) is considered very undesirable by most underwriters. See Barrel Storage.

COP—The top or head of a thing. The conical roll of thread formed on the spindle of a spinning machine.

COPAC—A vegetable fibre.

COPAL—Hard transparent resin used in varnish making. If diluted with spirits of turpentine it produces copal varnish.

COPING—The flat stones, iron or terra-cotta tile placed on top of a wall to protect it from the weather.

COPPER—A metal of red color which does not tarnish or oxidize easily. Melts at 1981 degrees F.

COPPER PLATING—Ammoniacal solutions of copper and potassium cyanide usually used. Good fire risks. See Electro-Plating.

COPPER REFINING—The hazard in the electrolytic process is not much more than that of an electric plating establishment. Hazards of paraffin tanks for dipping cathodes. If a number of electrolytic tanks are connected in series the electrical hazard is somewhat increased.

COPPERAS—The name given to sulphate of iron. Goods dyed with copperas are said to be subject to spontaneous combustion.

COPRA—The dried, broken kernel of the cocoanut after

it is split and ready for shipment. Liable to spontaneous combustion. Exported in burlap bags. Copra is dipped in sea water and dried before shipping. Hard to ignite but once ignited, burns fiercely. When packed in jute bags more subject to spontaneous combustion. Very susceptible to water damage.

Recommendations—1. Should not be stored in sacks, but in bulk, preferably in cement or all-metal bins. 2. In any case, storage should be subdivided by spaces into blocks of not over 400 square feet area with suitable aisles between blocks, and aisles between blocks and outside walls so that fire and water damage may be confined to a portion of the stock. 3. Every precaution should be taken to avoid water damage. If warehouse is of more than one story, floors above where copra is stored should be thoroughly waterproofed, flashed and scuppered. Sacked copra should always be raised on skids. If salt water is available, it should be used for all fire protection supplies. 4. Owing to the action of the oil on rubber, only approved linen hose should be used in buildings and electric light wiring should be designed to prevent destruction of rubber insulation by the oil.—Louisiana Fire Prevention Bureau.

COP YARN (used for weaving cloth)—A loose-twisted thread of cotton, silk, wool or mixture.

CORALINE—Used as a substitute for bone. Obtained from the agave plant.

CORBEL—A bracket usually of brick, consisting of several courses built out from the face of a wall usually for a chimney support.

CORDAGE—See Fibre.

CORDEAU DETONANT is a fuse consisting of a thin-walled lead tube filled with trinitrotoluol.

CORDITE—A form of gun cotton. Very explosive.

CORDONNET—A name given to charged silk.

CORDUROY is not easily damaged by clean water providing the material is a good grade. The cheaper grades are coated with a gummy substance and do not allow much salvage if thoroughly wet.

CORE—Anything serving as a mould around which something else is to be formed.

CORE OVENS are usually constructed of brick with perforated metal floors and are either heated by hard coal fires, fuel oil or gas. Flasks should never be placed (if of wood), on top of the ovens. The fire record shows 15.3 per cent of foundry fires are traceable to core ovens. The heating of the ovens in drying the cores, which are sometimes mixed with a molasses compound, drives off a heavy smoke which causes a black, sticky deposit to form on the vent pipe or stack. See Foundries.

CORK—The bark of a tree. Pieces are soaked in water, pressed flat, dried and baled. It burns with a dense smoke. Cork is bleached with oxalic acid or chloride of lime.

CORK (Agglomerated Cork) is known as Silax; used for cork discs. Ground cork is placed in ordinary bread-mixer and mixed with boiled solution of albumen and glycerine.

CORK BOARDS COMPOSITION—Cork received in bales, ground in high-speed knife grinders, the dust removed in separators and then mixed in steam-heated mixers with pitch (mixers resemble dough-mixers), then cooked in steam cookers and cooled in iron air-cooled moulds. The edges are trimmed with saws and sometimes planed smooth.

Ordinary cork board is made from ground cork with no other ingredients. The natural resin in the cork is sufficient as binder when drawn out by heat (about 500 degrees F.). The cork is fed from a steam box through blower system to hydraulic presses of iron construction and passed on endless conveyor to a bake oven, a long affair of brick walls heated by coal, producer gas or coke, similar in appearance to a lehr in a glass works. Cork grinding is the greatest hazard in cork works. The cork should be screened and have magnets attached to screens or hoppers to attract foreign substances as the high-speed machines cause sparks and ignite the dust. After grinding, it is bagged and sold. Grinding should always be done in fire-proof cut-off sections or in detached buildings properly vented. The mills produce heat through friction and are preferably water-cooled. They should be of iron construction and have banking devices

under the rollers similar to a malt mill in a brewery. A dusty process; requires vapor-proof electric light globes and good ventilation. A poor class. See Bottle Stoppers.

CORK CEMENT—Chiefly crude shellac and wood alcohol and cork.

CORK DRYERS or ovens are of high temperature, and fire heat may ignite edges of cork blocks while being dried.

CORK DUST is said to be subject to spontaneous combustion if moist. Cork dust is of explosive character when in suspension mixed with proper amount of air.

CORK LEATHER is powdered cork and india-rubber.

CORK PUTTY—Asphalt, cork and heavy oil.

CORK VARNISH, used extensively to protect the interior of ships from undue humidity due to sudden changes. It is made of a mixture of ground cork mixed with litharge and copal and other similar substances.

CORK WORKS—See Cork Boards.

CORN CURE, made by some druggists by dissolving scrap celluloid with acetone.

CORN MEAL—If damp and piled high is liable to ignite spontaneously.

CORN OIL—A refined by-product from the manufacture of cornstarch. Used in the preparation of lard substitutes, in producing linoleums, fibre goods, as a table and cooking oil, also in foundries for making cores.

CORNER BUILDINGS, from an underwriting standpoint, are more desirable than buildings in rows, because a fire can always be fought from at least two sides.

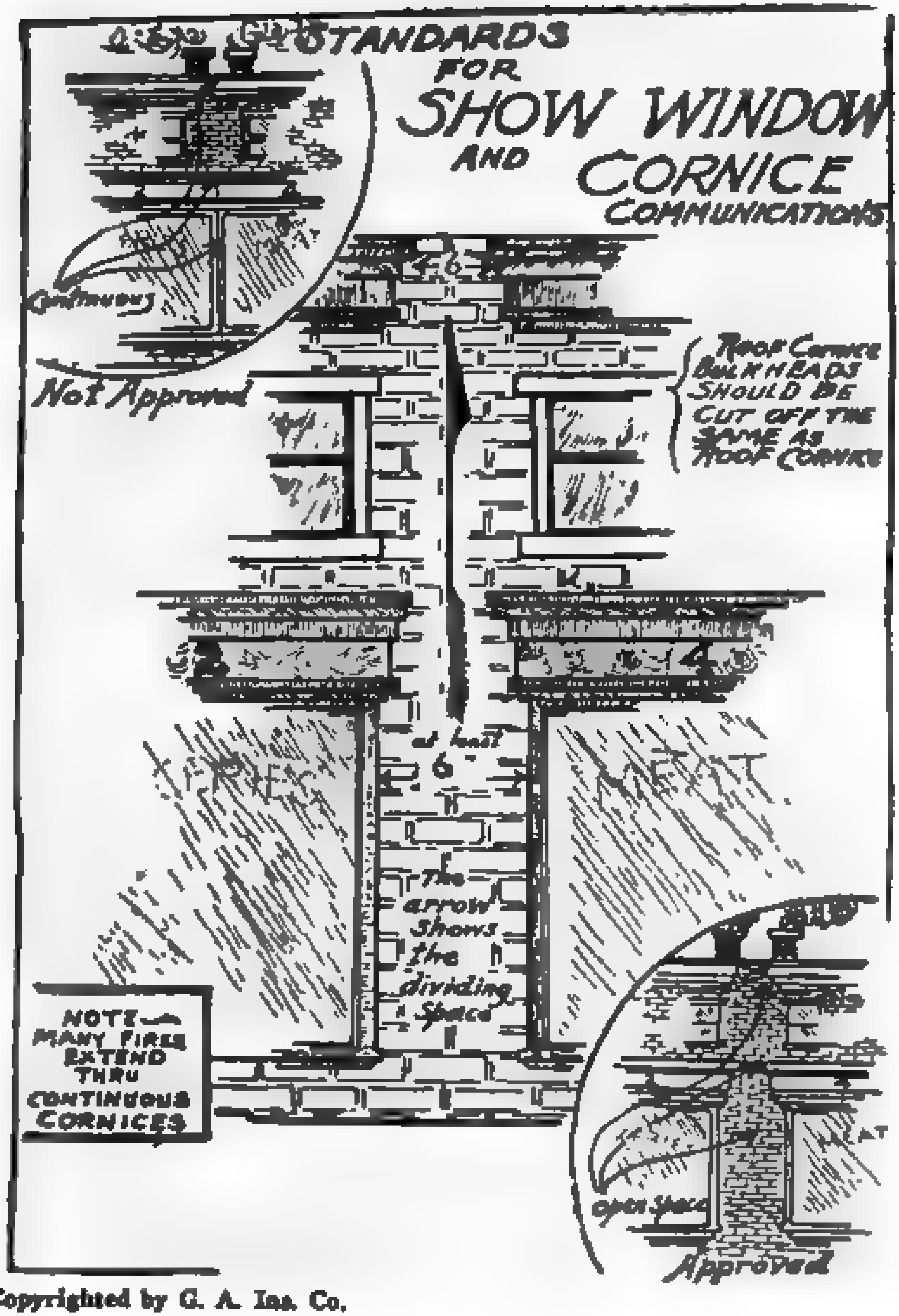
CORNICE—The ornamental projection at the eaves of a building or at the top of a pier.

CORNICES and cornice bulkheads should not be continuous. At least a six-inch open space must be maintained between adjoining properties. Fires have been known to travel across fronts of rows in this manner and not be discovered until they have broken out in some remote place.

CORNSTALKS are now being used in paper-making.

CORRALINE—A red dye derived from carbolic acid.

CORRODED PIPES—See Gas Explosion.


STANDARDS FOR SHOW WINDOW AND CORNICE COMMUNICATIONS
Continuous
Not Approved
Roof Cornice Bulkheads Should be Cut off the same as Roof Cornice
at least 6"
The arrow shows the dividing space
NOTE — MANY FIRES EXTEND THRU CONTINUOUS CORNICES
Open space
Approved

CORRUGATED IRON on wood stud is considered practically the same as frame construction.

CORRUGATING PAPER MACHINE—A machine with two sets of steam-heated corrugated iron rollers through which the paper is run after being glued at a glue tank.

CORSETS, especially of cheap grade, will not give much salvage if wet on account of the steel frames, which rust very quickly. Better grades of corsets offer good salvage, providing they are dried immediately. Foreign-made corsets are generally embroidered and specially designed, hence a greater water damage is looked for in this class. Where bone stays are used instead of steel stays, the salvage is better.

CORSET MANUFACTURING—Work is principally cutting, sewing, pressing, attaching parts and cleaning spots from goods. The class of work requires a clean shop to prevent goods from being soiled. A good class if parties have good commercial rating.

CORSET STAY (Description of)—Steel ribbon (corset steel) is coated by a squeeze process (similar to rubber coating of electric wires) with a composition similar to pyroxylin (celluloid). This is applied in two coats. The pyroxylin is evidently of a different composition from that usually manufactured, as some composition other than camphor is mixed with the nitro-cellulose. This composition on being tested shows that same will disintegrate without flame upon moderate heating, showing a strong similarity to pyroxylin in this particular. This composition is highly inflammable, and the ignition point is apparently very low. Poor insurance risks.

COSMOS—A fibre from flax and hemp.

COST OF CONSTRUCTION AND REPAIRS—See Appraisals.

COST PRICE—See Sound Value.

COTTON—No other product of American industry is packed and shipped in such a slovenly manner. It is enclosed in partly old, second hand, loosely woven jute rags, bound with steel hoops. It is gradually torn to pieces by teamster's *hooks, jack* screws and rough handling. This is the cause of

so many fires attributed to cotton. Inherent fires in the Egyptian and Indian cotton bales are practically unknown. The Egyptian bale is compressed to 40 pounds, about twice the density of the American compressed bale, and the Indian bale is compressed to as much as 55 pounds. The Egyptian bales are covered with finely woven burlap and are held by 11 strong steel straps, while the Indian bales are covered with a similar burlap with a single steel band, which runs spirally around the bale.

Cotton, once ignited, is capable of maintaining smoldering combustion for a number of days. Baled cotton often ignites from friction in center of bale and will not flame at surface for several weeks after so igniting. Not believed to be subject to spontaneous combustion. See Boll Weevil.

COTTON BATTING MILLS—Raw stock is mill waste and sweepings from cotton mills. Pickers, cards, lappers, garnetts, constitute the machinery used. A poor fire-record class.

COTTON—DIPPING COTTON—A secret, non-inflammable process is now on the market which, it is claimed, will eliminate the hazard of fires in this class. One of the railroads has decided to have all cotton dipped which travels over their roads, so that the same can be placed on open flat cars; in a recent experiment a flat car loaded with cotton traveled nearly 100 miles without a fire resulting, although the car containing the cotton was next to the engine. Shipping cotton on flat cars will release many freight cars for other commodities, and by fireproofing it, a large sum of money will be saved annually.

COTTON GINS—The processes usually divided into three sections, the warehousing of the cotton containing the seeds (seed cotton), the gin-room proper, where the separation is made, and the lint pressed into bales, and the warehousing of the seed after the lint has been removed. Many gin fires are caused by hot bearings, cotton becoming wrapped around the rapidly revolving brush shafts and cotton clogged at the end of brush drums. The majority of fires have been traced to static electricity. All machinery should be grounded. Underwriters write this class warily.

COTTON MILLS—The cotton is taken from the storehouse to the opening room, where the ties are removed and the bales pulled apart by hand or by machinery. The cotton is then blown into the picker room, usually by an approved system similar to the blowers in a wood-working plant. The machines in the picker room are known as breakers, intermediate and finisher lappers. They consist of a cylindrical metal box, inside of which is a steel shaft, to which are attached arms which beat the cotton to a loose, fluffy state, all foreign material going to the bottom of the enclosure. The cotton is delivered through a slit in one side of the box in the form of a sheet, and is then rolled around a steel rod in a roll known as a lap. After leaving the picker room, the cotton goes to the cards. This process consists of passing the cotton between rapidly revolving cylinders covered with wire teeth to straighten out the cotton fibres and lay them parallel to one another. The remaining process of drawing, slubbing, speeding, spinning and weaving are merely preparatory processes and present little, if any, fire hazard. The main hazard in a cotton mill is the picking. Fires are frequent in the fan through which cotton is blown from the opening room to the picker, due to friction when threads get wound around the bearings. Foreign substances in the cotton also cause fires.

COTTON OIL REFINERIES—The refining of crude cotton seed oil by the caustic soda process is briefly as follows: The crude cotton seed oil is pumped to storage tanks, and as needed, it is pumped into refining tank (where the oil is agitated or stirred as the alkali water is mixed in). At the bottom of tank is a system of closed steam coils which furnish the heat necessary for the proper refining of the oil. The oil is heated to about 80 degrees F. after which the alkali solution is let in and the mixture stirred slowly. After a short time, the alkali is shut off and the agitation retarded to a slow moving motion. The mass is then heated to about 120 degrees F., when the heavier portion, called "soap stock," rises to the top and the clear oil falls to the bottom. The clear oil is then drawn from the tank, by a syphon, into the

rectifying tank. The bleaching tank and filter press are the final operations.

Fires are sometimes caused by spontaneous combustion in old filter cloths. The special hazards of this class are spent or used fuller's earth, filter-press cloths, storage of oleo-stearine and refrigeration.

COTTON-PICKER FIRES are commonly attributed to "foreign" substances in the stock. This foreign substance is supposed to be stones, pieces of metal or matches. Statistics show that there are more picker fires in the winter than in summer, and more in "dog days" than in May, June or October. Some believe the humidity of the picker room itself has something to do with it. When the relative humidity of the picker room is below 25 degrees the cotton may become so dry that it is readily ignited by a small spark, and when it is above 80 degrees, cotton becomes so limp that it winds up and packs on moving parts of pickers, thereby causing fires. It is claimed that a part of these fires could be prevented by avoiding both extremes of humidity in the picker room. (See Humidity a Factor in Cotton Picker Fires, Vol. 9, N. F. P. A., April, 1916.)

COTTON PIERS—Sprinklers are absolutely necessary to prevent "flash fires" spreading over the surfaces of baled cotton. In May, 1916, a fire started in about 1,200 bales of cotton stored on one of the Bush Terminal piers, Brooklyn. Sixty-five heads operated and held the fire in check until the arrival of the fire department. A few hours later fire was discovered in a cotton warehouse about half a mile away. The fire department would have been severely taxed with these two cotton fires at one time had the pier and warehouse not been sprinklered.

A great many fires are caused by matches being dropped on piers and docks by careless workmen, and fires are started by the friction of moving the bales. Such a fire is liable to smoulder for several days before it is discovered, by which time it has had an opportunity to spread, so that its extinguishment is a difficult task. There is never any certainty that a cotton fire is out until every piece of each bale has been hand-*picked and thoroughly* water-soaked. A great

many cotton fires have been traced to compress and gin owners who entered a low-grade cotton on their books, then burned it to collect the insurance. See Piers.

COTTON POWDER—See Tonite.

COTTON SEED FIBRE MILLS—The raw stock comes in the form of cotton seed hulls. They are generally unloaded and delivered by worm screw type conveyors to the warehouse for later use or sent by screw conveyor to the grinding division of the factory. A section of the conveyor is made of metal with steam jacket. The dryness of the hulls is regulated by this heat before they enter the first attrition mill having a magnet attachment. The hulls after passing through the first mill go to a beater for the separation of the free hull meal from the fibre and remaining hulls. The mill and beater process is repeated about eight times. The resulting fibre is of very short lengths and quite free from flash fire hazard. (Oscar A. Smith.)

COTTON SEED HULLS—Subject to spontaneous combustion when moist and piled deeply.

COTTON SEED OIL MILLS—The material coming to the mill is dirty and dusty and contains much foreign substances. The processes carried on have a tendency to produce flying dust and lint and the meal and oil have a tendency to get scattered about. The machinery is as follows: Cotton seed linter (with pneumatic system attached), rotary huller, beater and separator, crushing rolls, meal reel, cookers, cake breaker, cake former, attrition mill and cotton seed press. Oil mill fires generally originate in the seed cleaner room (which should be sprinklered) and apparently are not attributed to the special hazards peculiar to the class but from the common hazard of hot bearings. Lint pressing, hull grinding, seed cleaning or filtering of oil should be in separate brick buildings or cut off in fireproof sections. Seeds should pass through a blower equipped with magnets. Storage of cotton in the mills should be prohibited as should also washing of filter press cloths, coopering, painting and hulling.

COUCH MANUFACTURING—See Mattress Manufactur-*ing.*

COUNTERFORT—Vertical projections of masonry or brickwork built at intervals along the back of a wall to strengthen it.

COUNTERMAN—The person who attends the counter of an insurance office and passes on the merits of the business which is offered to the company by the "placers" from the various brokerage offices, binding and committing his company to liability on the risks offered. It is necessary that he be a good underwriter, as he must perform that duty with snap judgment, basing his calculations of line on his knowledge of conditions in his particular field, and the known hazards and construction of the risk to be covered. This position requires not only one possessing expert insurance knowledge, but a pleasing personality, so that placers and others offering business may be attracted to the office. See Examiners, also Underwriting.

COUNTER-SHAFTING—The shafting operating or actually driving the machinery, and itself being driven by the main or jack shaft.

COUNTERWEIGHT or counter balance. Any weight used to balance another.

COUNTRY HOUSES—See Dwellings (Palatial Country Houses).

COUNTRY STORES—Usually contain a miscellaneous stock, chiefly general merchandise. The heating apparatus is usually defective. Risks are often isolated in frame rows with poor protection. Fire record is poor. See Business Blocks.

COUPLINGS—A term used to express the arrangement for connecting two shafts so that they will revolve together.

COURSE OF CONSTRUCTION risks are usually good fire risks, especially if of brick or fireproof construction. Theatres, churches and halls in course of construction are not considered as good as ordinary buildings, owing to the great amount of scaffolding necessary to complete the high interior of building. Many fires have been caused in buildings in course of *construction* by the use of salamanders,

stoves, and careless mechanics using gasoline torches. See Builders' Risks; also Platforms.

COUTCHINE—See Caoutchoucine.

CRADLE—Applied to various kinds of timber supports which partly enclose the mass sustained.

CRAIGLETH—Natural hard stones used for cutting purposes. See Cut Glass.

CRANE—A hoisting machine consisting of a revolving vertical post or stalk.

CREAM OF TARTAR—Made from argols, the scrapings from the wine casks. Process is as follows: Ground in mill, roasted in steam or coal heated rotary cylinders, cooked with hydrochloric acid and hydrated lime in wooden, steam-heated tanks, precipitated, screened to remove liquor, mixed with bone black to bleach, filtered, dissolved, granulated, crystallized, dried, washed in hydrochloric acid to remove lead and lime, crushed, ground, sifted and barrelled. Hazards are dryers, storage of bone black and lime, and grinding in stone and iron mills. Tartaric acid, in the juice of the grape, is combined with potash forming a salt called cream of tartar. Fair insurance risks.

CREAMERIES AND DAIRIES—Although the up-to-date risks of this class are all steam process, the fire record is poor. See Dairy Farms.

CREDIT—Very important to the fire underwriter to know this, as it may tell whether a man or firm is likely to have a failure or a fire. Some enterprising fire companies are considering the idea of employing a credit man as a valuable aid to their office force.

CREEL—A frame in a spinning machine which holds the bobbins, slubbings or rovings.

CREMATORIES—Principal hazards are the high temperature cremating furnaces for burning the dead. Also dwelling and church hazard.

CREMONITES—Detonating preparations, partly composed of picrates.

CREO AUSTRALIN—A substitute turpentine obtained from chips of yellow pine. It also contains acetone, tar and oil. Flashpoint about 90 degrees F. Inflammable.

CREOSOTE—Produced by the distillation of wood tar. Used to impregnate wood. Nearly as inflammable as kerosene.

CREOSOTE OIL—See Heavy Oil.

CREOSOTING RAILROAD TIES—The Reuping process, with blow-back system. Under this system, the railroad ties are placed in impregnating cylinders and subjected for about an hour to an air pressure of 75 pounds, filling the cells of wood with compressed air. Without reducing the pressure in impregnating cylinders, creosote at a temperature of 180 degrees F., is forced into impregnating cylinders. When cylinders are full of creosote, the air pressure is raised to 200 pounds. Under this pressure the creosote penetrates into the cells of the wood, soaking the cell walls and compressing still more the air formerly put in at 75 pounds. The pressure of 200 pounds is maintained from 2½ hours to 4 hours, depending upon the nature of the wood. When wood is sufficiently impregnated, the air pressure is released and the expansive energy of the air in the wood forces as much of the creosote out of the wood as does not adhere to the cells of the wood. The surplus creosote is then blown back to supply tanks with a pressure of 8 to 10 pounds. The creosote is manufactured from bituminous coal, having a specific gravity of 1.178, and a flash point of about 500 degrees F.

CREOSOTING WORKS—The finished lumber should be piled a considerable distance from the plant as it burns very rapidly. Storage tanks containing the creosote fluid ought not be nearer than 50 feet to the plant, with underground piping having gravity return. No open lights or fires allowed in treating room, which should be a detached structure. The boiler should also be detached. Hard burning risks.

CRESYLIC ACID is poisonous.

CRIB CONSTRUCTION—Made of superimposed planks laid with broken joints and spiked together. See Piers.

CROCKERY (porcelain)—Kiln burning hazard, grinding, moulding, cutting, dry rooms and hand decorating. Use turpentine and varnish from individual bottles for decorating. Have machine shop for repairs, carpenter shop and storage

of packing material. Large area risks predominate. That which is imported from China and Japan is in rice straw, wrapped in matting and usually cased. See China Decorating.

CROCOKE—See Arakana.

CROSS-BRIDGING—Each pair of floor beams should be cross-bridged at intervals of seven feet in their length.

CROSS SECTION in an elevation drawing is an imaginary line cut through the center.

CROUSTADES—The pasty shells made of flour, water and sometimes eggs, fried in kidney fat. The grease is heated to a boiling point by direct gas flame. An iron mould is dipped into a pan of the paste, then into the boiling grease where the shell is cooked. All wood flooring around the grease kettles should be metal covered, and the grease pans should set on all iron supports. Used in hotels and restaurants in serving cut-up meats, fruits or sauces. Where these are made, the floors are apt to be grease soaked.

CROWN—A term applied to the uppermost or highest part of an arch, that in which a keystone is fixed.

CRUCIBLE WORKS—Crucibles are used for refining metals. The metal is placed inside of crucible and then same is placed in furnace. Crucibles are made of French clay and plumbago (which is black lead or graphite). It is moulded and then baked in brick (wood fuel) retorts. Good insurance risks.

CRUDE DRUGS—Consist mainly of herbs and roots in dry state. Most of them are very susceptible to water damage. Roots can be re-conditioned but will lose considerable weight in the process. This class burns with a heavy dark smoke which scatters throughout the immediate neighborhood and firemen find it difficult to locate the seat of the fire.

CRUDE OIL—See Petroleum. As it comes from the well is a heavy, oily liquid. Very inflammable when from Eastern wells; from Western wells, flash point is above 100 degrees F. to as high as 210 degrees F.

CRUDE PETROLEUM is crude oil.

CRYSTALLIZATION—Sometimes crystallization is produced by saturating a hot solution of the substance and then

cooling, though generally it is brought about by evaporation by which the solution is concentrated. The method of crystallization depends upon the nature of the solution. Very frequently it is necessary to crystallize under diminished pressure to prevent decomposition.

CUDBEAR—A purple powder used for dyeing.

CULLETT—Old broken glass and waste from melting pots of glass works.

CUMOL—In weak solution is used for sterilizing catgut and is without fire hazard.

CUPOLA—As used in foundries. The upright cylindrical stack of iron, lined with fire brick into which is dumped the scrap iron and fuel for melting. The molten mass flows through a trough to buckets, which are carried to the foundry. No woodwork should be nearer than 18 inches and the charging floor (where the coke, coal and old iron is put in) should be entirely of iron. A spark arrester should be used on the cupola.

CUPOLAS and towers on public buildings are frequently the depository for old records and furniture and fixtures. The City Hall (New York City) tower has been destroyed three times. The last fire in May, 1917, causing $20,000 loss, was caused by a careless workman leaving a charcoal furnace unattended.

CURB—The term "Curb" when used in connection with defining the height of a building is the established mean curb level at the front of the building. If the building fronts on more than one street, the datum for measurement shall be taken at the established mean curb level on the street of greatest width. When this width is common to more than one street, the datum for measurement shall be taken at that having the highest curb. The term "Curb," when used in fixing the depth of an excavation, is the established curb level nearest to the point of the excavation in question. Where no curb elevation has been established, or the building line does not adjoin the street, the average finished ground level adjoining the building shall be considered the curb level.—(N. F. P. A.)

CURRENCY—Cannot be insured. See Uninsurable Property.

CURRY SHOP—A place where leather is scraped, cleaned, smoothed and colored. Inspect for housekeeping.

CURTAIN BOARDS—Metal or other non-combustible shields placed around openings in the floor so as to bank the heat and allow the sprinkler heads to operate readily. The heat waves travel similar to water waves, rebounding when striking an obstruction.

CURTAIN WALL is the wall placed on the outside of steel skeleton frames; it only carries its own weight and merely keeps out the elements. No structural parts depend upon these walls.

CUSPIDOR HAZARD—The existence of wooden receptacles with paper or sawdust contents for absorbents should be prohibited.

CUSTOM OR MERCHANT TAILORS—Make clothing to order for individuals from measure. Tailor shop hazard.

CUTCH—A dye being the juice of a foreign tree. Considered subject to spontaneous combustion.

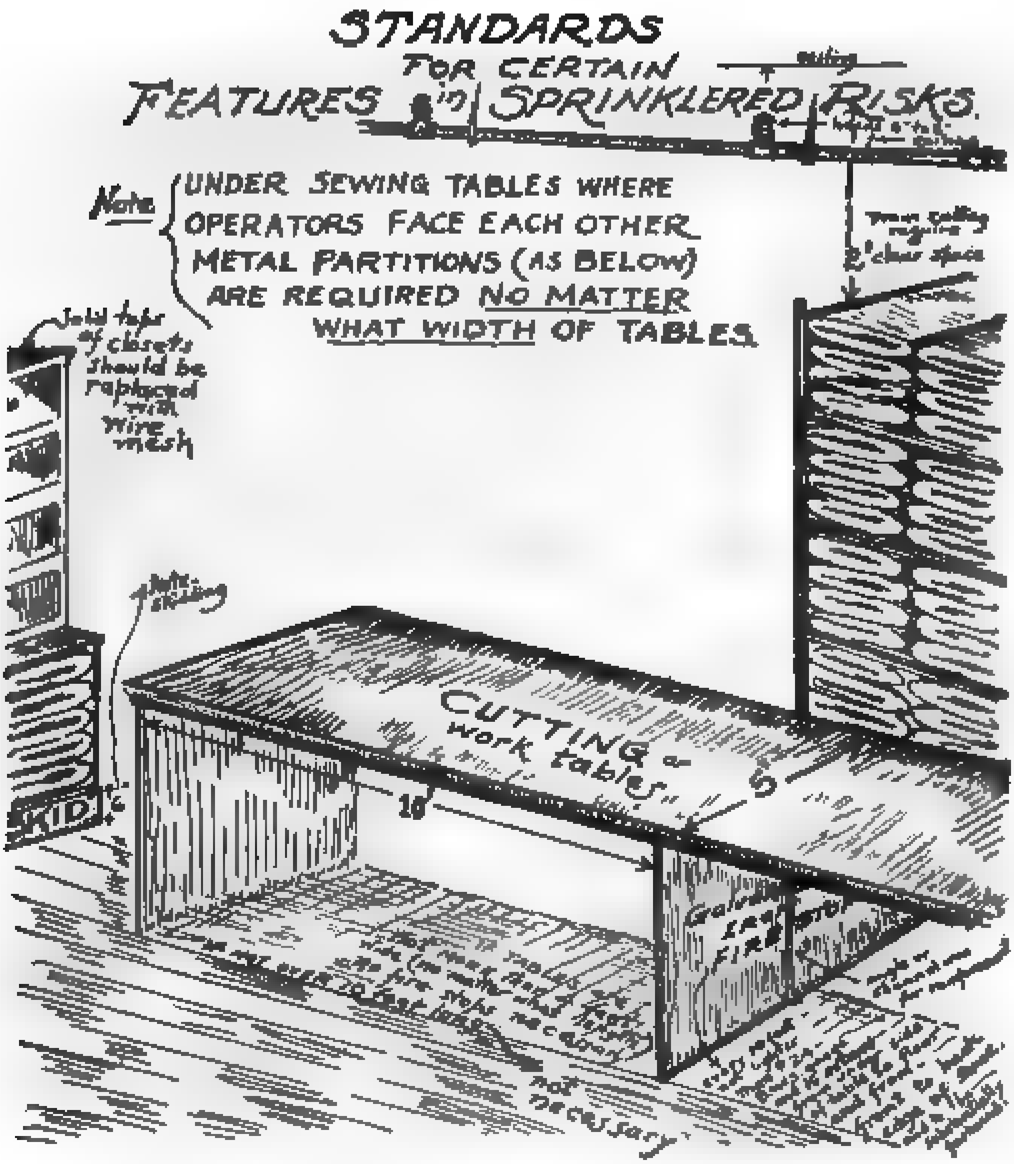
CUT GLASS is first blown into the general shape intended from the brilliant crystal and then ground into a cluster of glistening facets. Grindstones, continually moistened by streams of wet sand, cut the rough pattern, and emery wheels and putty powder finish the brilliant angles. After the glass is cut it is given an acid bath after the inner surface has been coated with paraffine and beeswax. The wax prevents the acid from eating into or staining the glass. Alundum (an oxide of aluminum) and craigleth (natural hard stones) are used for cutting. They crack under action of fire and water. In full process risks, glass blowing is an important hazard. Fair insurance. See Glass Works.

CUTLERY STOCKS—Apt to rust from moisture or dampness. Should be salvaged immediately after a fire. Very susceptible. See Tools and Instruments.

CUT-OFF—A term used by insurance men to signify that buildings are separated by brick division walls with standard or non-standard doors at openings. See *Communications.*

CUTTING AND WORK TABLES should have galvanized iron fire stops or partitions firmly set and fastened under them at 10 feet intervals. These are to prevent flash fires in the cuttings, from sweeping swiftly under the entire length of the table.

CUTTING BOARD SCRAPINGS—Should not be allowed to accumulate, nor be piled on or near any combustible ma-



THESE PARTITIONS UNDERNEATH TABLES WILL CONFINE A FIRE TO A SECTION FOR A LIMITED TIME THEREBY PREVENTING ITS RAPID SPREAD

terial, but should be disposed of by placing in safety cans. Numerous fires in shoe factories have been traced to this cause.

CUTTING BOARDS—See Shoe Factories.

CYANATES are cyanic acid compounds.

CYANIDE OF POTASSIUM—Deadly poisonous. Used by electroplaters in forming solutions of gold, silver, etc., and by photographers for "fixing." Liable to cause spontaneous combustion. Used in case hardening.

CYANIDES—Compounds of cyanogen with elements or metals. Most are poisonous such as cyanide of copper, potassium and sodium. They should not be stored near foodstuffs.

CYANITE—A base silicate of alumina, used for fireproofing scenery.

CYANOGEN is one of the most volatile of the distillates from crude petroleum. Flash point zero F. Classed as very inflammable. Cyanogen compounds (carbon and nitrogen combine to form cyanogen), a combustible gas which forms with chlorine. Sometimes used for fumigating purposes.

CYCLONE SEPARATORS—Are conical metal receivers with a vent at the top and a metal discharge pipe at the bottom. The stock being blown in near the top at an angle takes a spiral path, finally dropping without pressure through the discharge end to a metal container, and the air escapes through the vent at the top. Cyclones are usually on the roof of the shavings vault of a woodworker. See illustration, page 70. See Shaving Vault; also Blower.

CYLINDER OILS—Have flash point of about 500 degrees F., and a boiling point of 600 degrees F. (Not hazardous.)

CYLINDER PRINTING PRESSES have a large flat bed for the form containing the type, which passes back and forth under a revolving cylinder, the latter receives the paper from the feeding board and brings it into contact with the form beneath. See Printers.

D

DAILY REPORT—The copy of the policy, together with all other necessary information concerning a risk, sent by an agent or Branch Office to the Home Office of a company for the guidance of the examiner.

DAIRY FARMS—Bad fire record. Health board restrictions are said to have limited the profits of the business. In some States, if an epidemic occurs, the entire herd is confiscated. The State reimburses the owner to only fifty per cent of the value of the animals destroyed. Hazards of boiler, large area barns and large quantity of hay and straw on storage. See Creameries and Dairies; also Milk Depots.

DAMMAR—A resin similar in appearance to gum arabic.

DAMMARA—A gum or resin similar to copal.

DAMPERS—See Automatic Dampers.

DANCE HALLS—See Halls.

DANGEROUS GOODS—See Storage Lines.

DANGEROUS PROCESSES—Most manufacturing risks would be desirable insurance if their dangerous processes were isolated or cut off from the balance of the plant by heavy brick walls with "labelled" automatic fire doors at communicating openings. Automatic sprinklers in these rooms would also greatly aid in the protection of the plant.

DAVY SAFETY LANTERN merely has a wire mesh around the light, which prevents the ignition of gas outside of the wire.

D. C.—Abbreviation for direct current. See Induction Motors.

DEAD ENDS—Are ends of water mains which have no outlet. Consequently the sediment which accumulates cannot be washed out and in time may entirely fill up the pipe.

All water pipes should be so connected that there will be a continuous flow of water. See Water Mains.

DEAD LOAD—The weight of the structure itself plus any stationary or uniform load or stress.

DEAD OIL—A heavy oil distilled from coal tar after the distillation of the light oils. Used for impregnating wood. Not very inflammable.

DEAD RISER—In sprinkler equipments, is the riser which drops down from the tank supply to the basement without any openings. In the basement it connects to the live riser which supplies the heads. See Sprinkler Equipment. See illustration on page 637.

DEAD STORAGE—Automobiles are said to be on dead storage when they are not in use, and laid up for the season. Gasoline should be drained from the tanks, carburetor and piping, but this is seldom done.

DEAFENED FLOORS prevent sound from travelling from floor to floor. One of the best methods to deafen floors is to have a layer of cinders and concrete underneath the top flooring held by thin deafening-boards resting on cleats fastened to the side of beams or joists as shoulders.

DECALCOMANIE crockery decorating—Impression transferred from copper plate to paper by passing it through a roller, then transferred to crockery by hand. Mineral oils and turpentine are used in transferring work. Firing kilns and packing material constitute the hazards in this class. See China Decorating.

DECARBONIZE—See Tempering; also Tools.

DECLINE—A notice, verbal or written, from the company to the insured or his agent, stating the company's refusal to accept, continue or assume liability.

DECK-FLOOR—The main floor of a pier. A narrow mezzanine floor or gallery between floors.

DECK-NOZZLE—The main nozzle for fire hose on a boat.

DECORATORS AND PAINTERS—Busiest season April to October. Oily waste and oily overalls left by workmen when decorating the interior of buildings have caused many

fires. Note supply of paints, oils, etc. As a class, "not attractive." See Painters.

DEEDS—Cannot be insured under the standard policy. See Uninsurable Property.

DEFLAGRATION—A term used to denote rapid combustion of metals by galvanism, also a setting on fire.

DEGRAS—Is wool grease.

DEGREE OF INFLAMMABILITY is determined by the attraction of the substance for oxygen.

DELIQUESCE—A salt which gathers moisture from the air is said to be deliquescent.

DELTA METAL—An alloy of copper and zinc with a small percentage of iron.

DEMOLITION OF FIREPROOF BUILDING—Gillender Building, 20 Wall Street, New York City, part sixteen and part nineteen stories high, skeleton steel construction, terra-cotta floor arches, all ironwork protected by 1½-inch terra-cotta. When the building was torn down, May 1st, 1910, it was observed that the steel work during removal was practically in as good a condition as at the time the building was originally built in 1896. The conclusions obtained from this rather unusual case were: 1st—The presence of corrosion in several small places where the steel work was exposed to the weather (this emphasizes the importance of proper protection against moisture). 2nd—A covering of cement mortar protects steel from corrosive influences better than any form of paint at present in use. 3rd—It is important to paint the steel both at the mill and after being erected at the building before the cement coating is applied.

DENATURED ALCOHOL consists of grain alcohol to which some liquid, such as wood alcohol, pyridin, benzine, or fusel oil is added, rendering it unfit as a beverage. Flash 40 degrees F. Classed as inflammable.

DENATURED OLIVE OIL—Olive oil with about 3 per cent rosin oil, mineral oil, distilled wood turpentine, pyridin, creosote, aniline oil or oleic acid.

DENITRATION—Converting a nitrated body back into its original form and thus removing its hazardous nature. The process is hazardous.

DENSE TILE—Hard terra-cotta tile of little porosity.

DENSITY—See Specific Gravity.

DENTAL GAS—Nitrous oxide gas. It is colorless, incombustible and non-hazardous.

DENTAL VULCANITE—A mixture of caoutchouc colored with vermilion.

DEPARTMENT STORES—Much of the stock displayed is of a highly inflammable nature, and as different in character as celluloid combs, ammunition or calcium carbide are from crockery, china and glassware. The stock is very susceptible to water damage and breakage, and may be ruined by smoke. The large well-holes, open stair and elevator shafts have been responsible for the spread of fire in most of these risks. If building is fireproof and sprinklered, with curtain boards on ceilings at openings, this danger is somewhat reduced.

DEPRECIATION OF BUILDINGS—There is really no set rule, in some cases a sliding scale may be applied, whereas sometimes an average figure is the better way. If the structure is badly worn, the depreciation would be correspondingly greater than a building kept in good repair. See Values of Buildings.

DEPRECIATION OF MACHINERY—For a great many kinds of machines, experts have arranged a percentage table whereby a regular deduction each year is applied. In some machines there is practically no important depreciation for several years while others must be entirely rebuilt after very little wear.

DERBY ELECTRIC RELEASE BOX is a simple device, built on mechanical lines, designed to close fire doors, stair and elevator traps, and dip tank covers, open theatre ventilators, drop theater fire curtains, shut down conveyor systems, hot air blower and exhaust systems, and engines.

It may be operated by one or more of the following methods:

1. By the operation of an electric circuit closer connected to an alarm valve in a sprinkler system.
2. By the operation of an automatic thermostat system.
3. By the operation of a private fire alarm system.

4. By the operation of a manual switch.

DESICCATION—To entirely exhaust of moisture, usually by artificial heat.

DESTRUCTIVE DISTILLATION—The decomposition by heat of a substance in a closed vessel out of contact with air. In the process liquid and gas is given off and a solid remains.

DETACHED—A structure which does not adjoin another structure. Not necessarily isolated. Number of feet detached should always be mentioned on inspection report.

DETERGENE—An approved benzine substitute, classed as non-volatile.

DETONATING FUSES usually contain several ounces of a high explosive such as picric acid or nitrocellulose.

DETONATORS—Substances which explode violently when heated or struck; used chiefly to fire other explosives. See Fuses.

DEVILING—The picking apart by machinery of fibres or similar materials.

DEXTRINE—Made from starches. Used as a stiffening substance and as a food. Sometimes called British Gum. The best is made from potato starch from Japan, tapioca and sago from Java and Sumatra, and cornstarch or similar starches. Received at mills in bags, mixed in agitator where a one per cent solution of various acids such as muriatic, acetic and nitric; salts, hypochloride of soda, magnesium chloride and similar materials are added by a sprayer as the machine revolves, then it is roasted in brick-enclosed coal fuel roasters, ground in centrifugal crusher or grinder and bolted. Roasters are similar to brick-enclosed coffee roasters, with a revolving drum enclosed in brick. The dextrine in roasters will take fire if the drum ceases to revolve. The hazards are roasters, grinders, and dust settling on bearings and shaftings of machinery.

DIAMOND METAL POLISH—Flash point 204 degrees F. Classed as non-volatile.

DIAMYL, obtained during the distillation of coal. Very inflammable.

DIAPHRAGM—A *single* or double-movable plate or par-

tition placed across or inside of a tube, pipe or other hollow body to record fluctuations in pressure or heat, to hold back liquids or gases or to allow variations in pressure without impairing the efficiency of the device.

DIE—A hard block of metal or that part of a stamping machine which cuts out or makes an impression on an article, such as a coin. Those with a fine cutting edge are classed as "edged tools," owing to their susceptibility to fire damage.

DILAPIDATED BUILDINGS—Are not only uninsurable risks, but are also a menace to adjoining properties.

DIMETHYL ANILINE—An intermediate product in the manufacture of aniline colors. A product of nearly equal parts of wood alcohol, aniline oil and about 10 per cent of oil of vitriol, produced by cooking at high temperature in an autoclave. See Aniline Colors.

DI-NITRATES are classed as explosives.

DI-NITRATING is a hazardous process.

DINITRO-CHLOR-BENZOL in crystal state will feed fire. Not very inflammable and only slightly explosive.

DI-NITRO COLORS—See Dyes.

DIP BLACK—See Shoe Factories.

DIP TANKS with automatic covers. Should be in a one-story high building. Floor to be incombustible and should pitch to one side and have drain pipe leading to underground well (drain pipe 6 inches and have coarse strainer ¾-inch mesh at first floor). Dip tank should be steel or iron plate riveted together. Should have wrought-iron overflow pipe leading outside of building to a well, these pipes to be at least 3 inches where tanks hold less than 100 gals., and 4 to 6 inches for large tanks, overflow to have coarse strainer at tank; the well, to which overflow pipe leads, should be ventilated, and should be at least four times the capacity of tank. Well should be at least 15 feet from building, located downhill and be so arranged that any overflow therefrom cannot endanger buildings. Tanks should have automatic covers; a folding hinge cover is generally most convenient. Cover to be metal or wood covered with lock-jointed tin, and overlap the sides of tank, and be secured with strong metal hinges, the hinges being offset and projected against gumming. A

: and chain and counter-balanced weight makes a
r arrangement. In addition to above, it is often ad-
locate a metal hood directly over tank, hood to
:al flue pipe, which discharges into a properly con-
:ick chimney. The hood should extend well over
ık and should be as low down as feasible, the hood
the double purpose of preventing, at least to some
ter being thrown into the tank by sprinklers or
also, taking off flames from the burning liquid in
utomatic cover should fail. (H. A. Fiske.) See

'G **ARTICLES** in tanks containing inflammable
:h as japan, enamel, varnish, etc., no matter how
.ed, constitutes a severe hazard. Open lights are
ted in same room. Poor insurance risks wherever
is done, unless properly cut-off from balance of

[G **COTTON**—See Cotton.

Γ **CURRENT**—Abbreviation is D. C. See Alter-
:rent.

Γ **EXPANSION SYSTEM** (in cold storage)—See
ıge.

Γ **FEED TO BOILERS** from blower systems for
ngs. The feed pipe connects directly with the
stem, the feed end placed at the boiler feed door
ıavings blown in. Automatic dampers in the feed
:nt back-fires from racing up the duct in case of
of the shavings or shutting down of the blower.
ıgs Vaults.

Γ **LOSS**—The loss of capital due to damage or
ı of the buildings, machinery, stock or other real
al property. This loss to the owners is usually
by means of fire insurance.

'**ECTANTS**—Ingredients used are creosote, glyce-
r, camphor oil, resin, charcoal, Texaco spirits, sul-
relytum, Russian turpentine, caustic soda, naphtha-
ıaldehyde, bicarbonate soda, chloral, mineral oils,
(cocoanut oil), carbolic acid, coal tar, acetic acid,
ınd *essential oils.*

DISPLAY FIGURES AND FIXTURES, as used to display clothing, dry goods, furs, etc., are complete figures consisting of a wax head, false hair, glass or celluloid eyes, bust of papier-maché (enamelled), body of papier-maché (cloth covered), arms of wood, wax hands with celluloid finger nails, wooden or papier-maché legs, iron feet and a wire frame for skirt. Hazards are metal working with foundry, painting and japanning, wax heating by direct fire, making depressions in wax (such as dimples), with heated tools, woodworking, painting complexions with air or hand brush, inserting hair by first warming the scalp near a stove, papier-maché form making, drying, enamelling, painting and lacquering. Class of help is inferior. Early fall and early spring are the busiest seasons. This class is, as a rule, a poor one.

DISTILLATION—See Distilleries.

DISTILLED LIQUORS—See Liquors.

DISTILLERIES—There are approximately 233 in the United States. Distilling is separating the lighter parts from the heavier parts of a substance by vaporizing in a still and recondensing same into liquid form by sudden cooling. High proof liquors, such as whiskey or brandy, are made in distilleries. Alcohol, cologne spirits, fusel oil and other alcohol by-products, are produced in the process. Except brandy, most are made from grain. Distilleries embrace many of the brewery hazards. The grain is reduced to a meal, mixed with water, cooked in steam kettles at high temperature, run to fermenting vats where yeast is added. The liquid is drawn off and then pumped to a so-called beer-still (usually copper), at the top of which is an opening to which is attached a long copper tube, one end of which is inserted into a vat and connected to a worm (a spiral copper condensing coil), immersed in water. The mash is boiled until the liquid is vaporized and recondensed in the worm. The product of this distillation is known as high wines. Direct heat, sometimes used for stills, is more hazardous than steam. Coal, coke, oil or gas are used for fuel. The liquid produced by the first distillation is redistilled and the vapor therefrom passes to a column, which is a cylindrical separator containing several cells which are designed to condense cer-

tain of the spirit vapors. Some of the cells are connected to "leaches" or rectifiers, which are receptacles containing powdered charcoal through which the liquid is forced for cleaning or filtering. There are various methods of distilling, some being a continuous operation. Hazards are open lights in the presence of alcohol vapors, charcoal storage, putting stoves inside of charring vats for drying, painting, branding and coopering barrels or kegs, the method of still heating and alcohol handling. Setting of furnaces is an important hazard. A hard burning class. See Liquors.

DISTRIBUTION CLAUSE reads as follows: "It is understood and agreed that the amount insured by this policy shall attach in each of the above named premises in that proportion of the amount hereby insured that the value of the property covered by this policy contained in each of the said premises shall bear to the value of such property contained in all of the above named premises." When this clause is attached to the policy it distributes the insurance over the property (at the time of the fire) in the same proportions as the values are distributed and the policy immediately becomes specific insurance for the amounts so ascertained. Example: Insurance carried, $10,000. Merchandise in building, "A," $5,000; in building "B," $5,000; in building "C," $10,000. Total value, $20,000. Building "A" gets 5,000/20,000 of $10,000, or $2,500; building "B," 5,000/20,000, or $2,500; building "C," 10,000/20,000, or $5,000.

DISULPHIDE OF CARBON (carbon bisulphide) is a very inflammable liquid. When its vapors mix with the air, hydrogen or carbonic acid, both highly explosive gases, are produced. A mixture of air and the vapors from bisulphide of carbon will explode at about 300 deg. F. The flash point is very low and under certain conditions the liquid may be exploded by shock. It is made by passing sulphur vapor over red-hot charcoal and when burned it produces quantities of suffocating gases. It is a colorless, heavy liquid, with an odor resembling rotten eggs. It is a serious fire hazard and should never be allowed inside of main buildings. It is sometimes used to fumigate stocks of tobacco, as a solvent for gums and resins, for extracting grease from wool, also to

extract oil from various seeds. It may also be used as a disinfectant and germicide insect killer. See Carbon Bisulphide. (F. J. McFarlane.)

DIVI-DIVI—A vegetable product from Venezuela used in tanning and dyeing.

DOCKS—See Piers.

DOLLS—Indestructible dolls. Any or all of the following materials may be used to make the "dough"—ceresin wax, paraffine, glue, whiting, wheat-paste, linseed oil and rosin, colored with oil colors. They are moulded in forms under die presses, dried, sandpapered to remove roughness, enamelled in dip tank (enamel thinned with turpentine or benzine), painting complexions with air sprayers or hand brush, and lacquering. A celluloid enamel is generally used. Heating of wax mixture by direct heat, use of benzine, enamel and lacquer are main hazards. A quick burner.

DONKEY ENGINE—A small steam engine attached to a larger one and fed from the same boiler. Used for light work.

DOOR FRAME—The case in which a door opens and shuts. Consists of two uprights and one horizontal piece connected together by mortises and tenons.

DOORS—See Fire Doors.

DOORS—Safety releasing latch for exit door. The latch combines in a unit the usual locking devices, the door lock and top and bottom latches. The usual hardware trim is applied on the outside of the door. On the inside, about waist high, a solid bar stretches across the door. This bar stands away from the wood and connects directly with the mechanism of the latch. Pressure applied to any part of the bar instantly releases the lock and latches simultaneously and permits the doors to open. The simple operation of these latches under conditions of a panic is evident. The occupants of the building rush toward the exit doors and the leaders are forced against the bar across the doors, thus operating the latches automatically and opening the doors to safety.

DOPE—*See* Aeroplane Manufacturing.

DORMER WINDOW—A window which projects out of the wall just under the roof.

DOUBLE BACKING MACHINE—Used in paper box making. A long iron table heated by steam coils; on one end a large glue pot which glues one side of each of two sheets of paper which runs between wood or iron rollers, is dried while passing over the steam-heated table and reeled at opposite end. Glue pots should be steam heated.

DOVE-TAILING MACHINE—Used by woodworkers for cutting the fan or wedge-shaped grooves or projections used in making joints. The term dove-tail being given to the joint in question because of the resemblance of the interlocking projections to a dove tail spread out. The cutting tool, also shaped like a dove tail, is fixed in the end of spindle projecting up through a table mounted upon an iron frame and rotating very rapidly. Presents a danger of overheating bearings.

DOWEL—A straight pin of wood or metal inserted part way into each of two faces, which it unites.

DRAGON'S BLOOD—A resinous substance obtained from tropical trees.

DRAWN STEEL—(Drawing steel from a flat piece into cup-shaped pieces and tubes.) The machines used are similar to huge stamping presses. The thick plate of steel is placed on the bed of the press and a plunger, by repeated thrusts, makes an indentation which enlarges as the process proceeds and eventually presses out a cup-shape piece. These machines are called "reducing" or "drawing presses." Each press has a different sized plunger, the largest plunger being used first. After each reducing process, the steel is heated in a rotary annealing furnace before it is placed in the next press. When the tube is finally drawn out, it is washed in a rust-proof solution, and threaded to receive the nut. Heavy machine-shop hazard.

DRENCHERS—A name given open sprinklers, applied particularly in England.

DRESSMAKERS—Usually locate in dwellings without salesrooms or show rooms and the owner lives on the premises, called "parlor shops." Sewing and pressing is carried

on in a small scale. If under five hands working, without show room, and if owner lives on premises no extra rate is charged for this occupancy by some rating boards. The fire record is not very good.

DRESS PATTERNS (paper)—If kept in cardboard boxes in the open may be counted upon to suffer a bad loss from smoke and water. They are usually made of the cheapest grade of tissue paper, and should always be kept in metal cabinets. In dry goods and notion stores they form considerable of the value. A full set of dress patterns as sold by most large dress pattern firms is worth $250-$300, and are kept in open front pigeon-holed cabinets. See Patterns.

DRIP CUPS should be placed on all shafting, gearing and sewing machines to catch oily drips. They are usually made cup-shape of cast-iron.

DRIP LOOP—See Rain Loop.

DRIP PANS are necessary under spigots of oil and paint barrels in paint stores.

DRIP VALVES on sprinkler equipments must be sealed shut. They are used for draining the pipes and to test the water supply.

DROP FORGINGS—Forgings whose shape is impressed upon them by dies on which a heavy weight is allowed to fall.

DRUGS AND CHEMICALS—The European war caused a scarcity of certain chemicals and drugs hitherto imported. As a result, local concerns have hurriedly erected small plants for the manufacture of such goods. These equipments are for the most part built for temporary use and their crudity and lack of stability make them unsafe. Heavy pungent odors prevent firemen from locating seat of fire. Poor fire record. See Chemistry; also Chemicals.

DRUG STORES (retail)—Usual drugs and chemicals in small quantities. May bottle benzine, gasoline or alcohol, or make ointments and salves by direct fire heat (grease hazard). Basements should be inspected on account of packing material, empty boxes, surplus stock and untidiness.

DRUGS (wholesale)—Risks of this class not only carry large quantities of dangerous drugs and chemicals, but they *may also do the* following work: Drug grinding in stone or

steel mills, cutting, compounding, separating, bolting, sifting, mixing, drying and packing. All combustibles should be kept in an underground vault, cut off from the main building by standard fire doors. Drugs and chemicals such as ether, nitric acid, chlorate of potash, etc., should not be packed in the same box or in close proximity to each other, as a sudden jar, sufficient to break the bottles, may cause an explosion. Some of the causes of fires, according to fire reports, are spontaneous combustion in barrel of powdered charcoal, explosion in chlorate of potash storage closet, explosions of carboys containing nitric acid and barium dioxide, explosion in barrel of tar, fires in or near grinding and pulverizing machines probably due to friction of foreign substances or grinding, substances containing phosphorus and ignition of inflammable vapors in compounding room. Fires in this class are extremely dangerous because the action of radiated heat or the application of water in contact with certain chemicals, will cause fires or explosions of chemicals which of themselves would not be otherwise dangerous. Phosphorus should be stored under water outside of main building. An undesirable class for most companies. A fierce burner emitting heavy smoke. (J. Younes.) See Chemicals.

DRUID ROOF is cotton duck soaked in paraffine, borax and sulphate of magnesia, then painted with a composition of liquid asphaltum, soapstone and graphite. Said to be both waterproof and fireproof.

DRUMMOND LIGHT, made by causing the burning gases of hydrogen and oxygen to strike against a piece of lime. The lime becomes intensely heated and shines with a dazzling brilliancy.

DRY CLEANING AND DRY DYEING (benzine or naphtha process). Buildings should be detached from surrounding properties, the greater the distance the better. Entire construction should be fireproof, have no basements, and areas be as small as possible. Dry rooms should be cut off from main buildings and cleaning rooms, and only steam used to heat them. Steam pipes in dry rooms should have screens of wire mesh to prevent goods coming in contact with them, and racks for clothing should be iron. En-

trance to washing room should be from outside only. Perforated pipes or steam jets are recommended for extinguishing fires in these rooms with the control valve located outside of building and easily accessible. Ventilators should be near floor because the vapor falls, being heavier than air; vents to be about 6 x 10 inches with wire mesh screens. Distilling apparatus for reclaiming dirty liquids is usually located in cleaning room. Centrifugal extractors for drying washed goods generate electricity through rapid motion, and a spark is liable to explode the vapor in the machine. Naphtha and benzine should be stored underground as per requirements. Always a dangerous exposure. See Dyeing and Cleaning.

DRY COLORS—See Aniline Dyes; also Color Works.

DRY DISTILLATION—Heating without access to air, in closed receptacle.

DRY DOCKS—Fires have been caused by shavings and portable furnaces, soldering devices, oakum storage, painting and spontaneous combustion of oakum and oily waste. During the year 1918 a number of the largest dry docks were menaced by fire. See Floating Dry Docks. Also Shipbuilding Yards.

DRY EXTINGUISHERS—See Sawdust.

DRY KILNS—The most common causes of fires are overheating, faulty construction and uncleanliness. The intense heat fosters the fire when started. An efficient steam jet is the best fire extinguisher. Modern kilns are made of concrete with tile roofs. See Kilning.

DRY PIPE SPRINKLER EQUIPMENT—In unheated buildings where the water is liable to freeze sprinklers are installed "dry pipe," i. e., the piping contains air under pressure (instead of water) which holds shut an automatic water-control valve—called a dry pipe valve. This valve opens and admits water into the pipes when the pressure is weakened by the escape of air through sprinklers opened by fire. **Test of, in Fireproof Cold Storage.** Test number one was made with the circulating refrigeration system in full operation and started with an initial temperature on the floor of approximately 30 deg. F. Pans containing alcohol were lighted successively every 30 seconds. The first sprinkler head operated

7½ minutes after the lighting of the first pan of alcohol. ˀest number two was made with the circulating system ompletely cut off by starting with initial temperature of 30 leg. F. The first sprinkler head operated 15 minutes after ighting of the first pan. Extracted from detail report made ıy E. S. Clayton, March 19, 1913. See Sprinklers (Dry Pipes).

DRY PIPE VALVE—It is arranged so that the surface xposed to the air pressure is approximately six times of hat exposed to the water. With this 6 to 1 ratio only 15 bs. of air is needed to hold back a 90-lb. water pressure, but n practice at least 25 lbs. of air would be carried. When ıir pressure in pipes falls to a point where this 6 to 1 ratio s upset the dry valve opens. See Dry Valves. See illustraion, pages 622-623.

DRY POWDER EXTINGUISHERS—See Extinguishers.

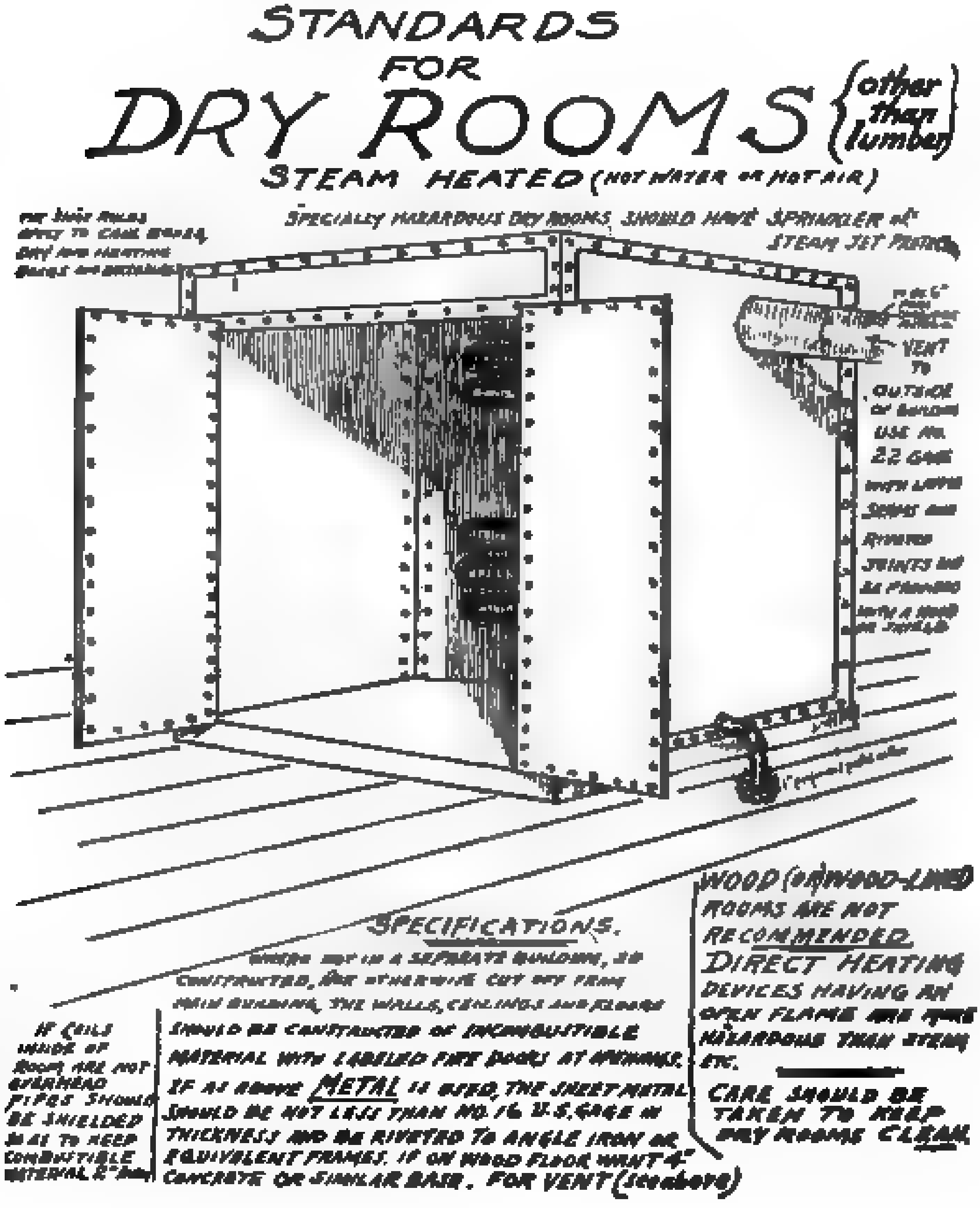
DRY ROOMS should be constructed entirely of incombusible material, i. e., terra cotta, brick, concrete, gypsum ılock or metal, and should be steam-heated. Wood dry ooms, even if lined with lock-jointed metal, are not stand-.rd. See illustration on page 188.

DRY ROT—Decay in such portions of the timber of houses s are exposed to dampness. The best preventive is a treatnent with creosote.

DRY VALVE ACCELERATOR—It is similar to a niggerıead in appearance (except larger) and is arranged to pass ir from the riser of dry line sprinkler system to the inermediate air chamber of a dry valve. When there are light changes in air pressure in the dry line due to leaks or ther causes, the pressure similarly changes in this device y passing to either side through a series of strainers. Howver, if a sudden and big change of pressure should occur such as caused by the opening of one or more sprinkler eads) the equalization could not take place fast enough and he fact that air on one side of this device was at slightly igher pressure than on the other, would operate to displace mechanically weighted valve which when open would imıediately offset the six to one ratio of pressure at the dry alve, and permit the water to flow through the pipes to the

open sprinkler before the air pressure of entire system was lowered as is the regular operation.

In a test consisting of tying a piece of cotton to a sprink-



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ler head and igniting it, 1⅘ seconds after the sprinkler head opened the accelerator valve opened and 6⅗ seconds later *water flowed* from the pipe. This makes an elapse of 8⅖

seconds from time head opened until water flowed, contrasting to the usual 20 to 45 seconds required.

The device is an added advantage to dry pipe sprinkler systems.

The accelerator is apparently a very delicate and at present is only rented to clients in connection with a regular inspection. Even under regular inspection, the valve may become gummed or strainers stopped up from impure water and rendering the valve unworkable, which condition (in case of an actual fire) would, perhaps, never become known.

DRYERS—Usually made of soaps composed of lead and manganese in some form or other, usually as the linoleate or the resinate. They are needed in all paints. It is assumed that they exert no chemical action, but attract oxygen from the air by virtue of their presence. May contain volatile oils. Benzine and turpentine are sometimes used in dryers. See Japan Dryers.

DRYING OILS—The chief one is linseed oil, derived from flaxseed. Subject to spontaneous combustion, especially if mixed with organic matter.

DUALIN—A foreign make of nitroglycerine. Explosive.

DUCTS—See Ventilating Shafts.

DUMBWAITER DOORS in the basement of apartment houses are usually blocked open or tied open so as not to inconvenience the errand boy delivering orders. Boys often stand at these shafts and smoke, and as the bottoms of shafts are sometimes filled with waste paper and rubbish even in the "high-class" apartment houses a fire is likely to occur. Sometimes large wooden packing boxes filled with paper adjoin these shafts. "Fire patrol" reports show numerous fires from these causes. Dumbwaiter shafts should be of terra-cotta, concrete, common brick or plaster block with labelled self-closing fire doors at all openings. See Shafts.

DUMPS FOR STREET CLEANING DEPARTMENTS, especially on water fronts, are littered with débris and rubbish. The rubbish is often scattered underneath piers and docks in the vicinity. All such piers should be enclosed from low-water line *to pier floor*, so as to prevent waste floating

underneath. Properties nearby are likely to suffer a bad fire damage. Many fires occur at these places.

DUPLICATING CARVER—The work is clamped to frames in a similar position to pattern or model, and by a parallel motion a blank tool and small cutters are made to pass simultaneously over the outline and surface of the pattern. Machine parts rotate 5,000 to 15,000 a minute and heat up. See Spindle Carver.

DURABOLD, a waterproofing compound. Flash point is 110 deg. F. Classed as non-volatile.

DUST—Accumulations of dust on bearings of machinery cause undue friction and numerous fires. Fires flash along dust-covered shelves or woodwork. The presence of much dust denotes poor housekeeping. Ordinary dust, such as found in offices, office buildings and schools, consists of human hair or hair from soft hats, wool and cotton from clothing, sand and dirt tracked into building, wings from dead flies, paper, iron from nails in shoes, carbon from coal smoke, salt from perspiration. The presence of bacteria in dust, aside from the fire hazard, is the reason boards of health and labor departments demand proper ventilation.

The most hazardous, the most easily ignited and the most explosive dusts are sugar, dextrine, coal, starch and cocoa. Almost any finely divided material will explode if mixed with air in the proper proportion and ignited—dust of coal, soot, grain, bronze powder, celluloid, lycopodium, dust from buff wheels. Where dust is produced in any process, proper ventilation and blowers to conduct the dust from the machines to a safe place should be provided, and if the dust is of an explosive character, explosion vents (small boxes or openings provided with covers kept in place with spring hinges) should be provided on the conveying pipes. As with sugar dust, there is often sufficient violence in explosions to wreck buildings where the quantity of suspended dust is sufficient to explode. See Fly.

Dust explosions, especially in grain and cereal mills, can be greatly eliminated if all floating dust is kept down to the lowest possible point by the use of fans and dust exhausts *at all points* where there is any movement of the wheat,

rain, etc. The upper pulleys in the elevator legs should e protected by automatic sprinklers and equipped with ɔurnal alarms.

All operating motors should be provided with a release evice acting as soon as the pressure upon them goes be- ɔnd the normal. Humidifying the atmosphere would tend a large degree to prevent dust explosions, but this proc- s is not reliable.

Fireproof construction in risks of this type is little better an ordinary construction, and panels of lighter construc- ɔn than the balance of the risk are not recommended. n entire side wall of light corrugated iron on an iron ame would prove a better and more effective vent in case an explosion.

The grinding feature can never be entirely eliminated as r as small fires are concerned. At the present time cutoff ctions with iron mills of standard design provided with agnets, banking devices under rolls, explosion vents and ater curtains have proven very effective. The recent dust plosion in the Dominion Government Elevator at Port ɔlborne, Ontario, Aug. 9, 1919, was probably caused by a oked lofter as smoke was seen coming from it. The upper illey was contained in this lofter and perhaps the opening the slide door at the top allowed an inrush of fresh air und the pulley and caused the smoldering belt to burn rough and fall. When this belt fell carrying its buckets ll of grain, a great deal of dust must have been disturbed the leg and the rapidly falling burning belt ignited the ıst.

Some of the rules which tend towards safety in this class e:

1. Keep your plant clean. See that beams, spouting, ma- ines and floors are free from dust. A dust-free mill or evator is explosion-proof.
2. Inspect the plant frequently for hot bearings.
3. Keep constantly on the watch for elevator choke-ups.
4. Report any slight rubbing, slipping, or other trouble th belts *or machines.*

5. Keep all foreign materials from entering the grinding machinery by installing a magnetic separator.

6. Do not smoke while in or near the mill or elevator.

7. Do not carry matches in or near the buildings.

8. Do not allow an open flame, lantern, or torch in the mill or elevator. Dust + open flame = explosion.

9. Do not lower artificial lights into bins to determine the amount of grain, flour or feed they contain. A weighted tape or measured rope will give better results and eliminate the fire hazard.

10. Prevent the accumulation of static electricity on machines and belts by proper grounding methods.

11. See that all electrical equipment is properly installed, light bulbs well protected, and switch and fuse boxes kept closed.

12. Sack the ground material immediately or convey it to bins of small capacity. See Sugar Refinery Fire, also Cork Factory.

DUSTLESS DUSTERS—Principally flannel saturated with linseed oil and paraffine. Subject to spontaneous combustion.

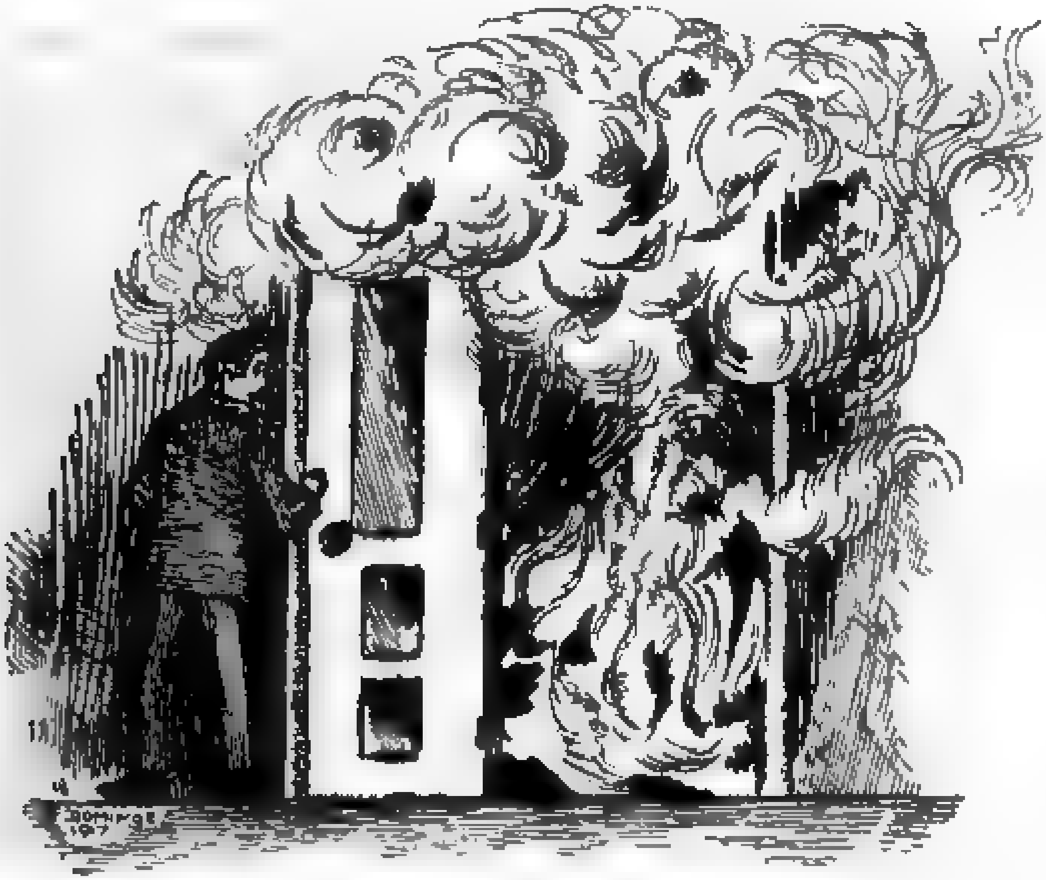
DUTCH OVEN—A sheet metal oven used in front of a grate, or in a bed of coals; roasting by radiated or reflected heat. May also be a brick set compartment in a chimney.

DWELLINGS—There are more fires in dwellings than in any other class of risk. Were it not for the millions of them insured they would not be written at current rates. Although many lives are at stake, building and fire departments and insurance companies give less supervision to them either before or after completion or occupancy than to other classes of buildings. There are more defects of common hazards in the ordinary dwelling than in the owner's factory. The tenants are, through familiarity, blind or indifferent to the need of fire prevention. As winter approaches fires are started in stoves or furnaces with no thought of the need of cleaning chimneys of birds' nests or soot, replacing rusted smoke pipes, protection under stoves or the general condition. Unsafe *gas jets,* which are penalized ten cents in nearly all

rate schedules of factories, are numerous in dwellings and cause many fires. See Apartment Houses.

Palatial Country Houses (Journal of Commerce, Nov. 27, 1916), owing to the lack of fire protection, open country and the high values contained therein, are now looked upon by underwriters as business to be avoided if possible.

DWELLINGS (fireproof)—Rating Bureau Requirements. All floor openings leading from the basement to the upper floors must be cut off in the basement by brick, terra cotta



In case of fire, close every door you pass through on your way out of a burning building. In this manner the oxygen necessary for combustion is reduced to a minimum.

or concrete shafts at least four inches thick with solid kalamein or kalamein and wired glass doors, with kalamein trim. If there is a continuous shaft from basement to upper floors, the former must be cut off in similar manner. Large air ducts used *in indirect heating* systems need no cut off, unless

they have openings in the basement, in which case automatic dampers must be installed. Elevator drum and motor room must be cut off in a standard manner.

DYE can be made from the roots, leaves and stalks of nettles. Used in woolen stuffs.

DYES—Mononitro and dinitro dyes are nitrated compounds and the manufacturing process is hazardous. Sodium nitrate, nitrites and chlorates are used in manufacturing.

Nitro colors are nitrated compounds and are very inflammable. Nitrophenol (sometimes called nitroso) when freshly made is liable to spontaneous combustion. Should be stored in detached shed.

Nitrated colors are dyes made by nitrating intermediates with nitric acid.

Sulphur Colors (or basic colors)—Sometimes called Sulphide colors. Used principally for cotton goods. Made by fusing the intermediate or parent substance with sulphur plus sodium sulphide or sodium polysulphide which are used as solvents. Among the substances used in making Sulphur colors are phenol (chemically pure) or as nitrophenol, dinitrophenol, nitrosophenol, chlorodinitrophenol (the latter should be kept away from nitric acid or nitrated colors), dinitrobenzol (explosive), dinitrochlorbenzole (very inflammable), aniline intermediates such as paranitraniline, nitrosodimethylaniline, naphthalene (nitro or dinitro), which is inflammable, acids, sulphur, salts, sodium nitrite, bisulphite, sulphide, benzidine, paranitroacetanilid, xylidine, toluidine, dinitrotoluol and carbon bisulphide. See Aniline Dyes; also Synthetic Dyes.

DYE WOOD—Extracted from logwood and fustic. Fires are sometimes caused from the union of chemicals used. Where stock is kept, especially in ground or powdered form even small fires usually result in severe losses owing to the fact that water will make the colors run. An unprofitable class.

DYE WOODS, such as logwood, are prepared for extracting the dyes by first cutting the logs in small pieces the size of kindling wood. These are put in an all-iron knife grinder revolving at about 950 r.p.m., then ground finer in corrugated

on roller machine, revolving at about 1,100 r.p.m., which duces the wood to finely divided particles ready for the eam vats. Hazards of high-speed grinders, high-tension lectric currents and transformer. See Logwood.

DYE WORKS in manufacturing, dryers and grinding are ne main causes of fire. See Bleach, Dye and Print Works.

DYEING AND CLEANING WORKS—Equipment consists of revolving washing drums using soap and water, centrifugal extractors, dye tubs and kettles, drying rooms, gas or electric pressing irons, gas-heated (or steam) crimpers, mangles. Materials used are chloroform (for removing spots), alcohol, benzine, acetic acid, sulphuric acid, ammonia, oxalic acid, sal soda, glycerine, neatsfoot oil, peroxide of hydrogen and blue stone. See Dry Cleaning.

DYERS, as a mordant, use thin solution of nitrate of iron and water for loading green cotton goods. See Dry Cleaning and Dyeing.

DYNAMITE—A high explosive formed by mixing nitroglycerine with an absorbent material to form a plastic solid. **Frozen Dynamite** should never be used. When frozen it is thawed out before being used. Should be stored under ground below frost line. See Explosives.

DYNAMITING BUILDINGS to check the path of a large or sweeping fire is seldom employed in the cities, although more or less explosives have been used for this purpose in all conflagrations.

DYNAMO CLAUSE—See Electrically-driven Machinery.

DYNAMOGEN—An explosive used largely in cartridges, consisting principally of chlorate or prussiate of potash.

DYNAMOS—See Electrically-driven Machinery.

DYSLYSINE—An organic substance obtained by boiling chloridic acid with hydrochloric acid.

E

EAGLE SOLVENT—A benzine substitute, classed as no volatile.

EARNED PREMIUM—That portion of the premium re resenting the length of time the company has assumed li bility; the premium for the length of time the policy h been in force, and retained by the company in case of ca cellation. See Premium.

EARTH OIL is petroleum.

EARTH PAINTS are those like iron oxide or red pa Iron oxide is a dry red substance, usually kept in bag

EAVES—The edge of a roof which overhangs a w It is designed to carry off the water and prevent it flow down the side of the wall.

EBONITE—A black substance produced by heating in rubber with melted sulphur. Sometimes called Vulcanit

ECCENTRIC—An irregular shaped wheel or plate rev ing on a shaft but producing an off-center or irregular tion.

EDGED TOOLS—See Instruments.

EDGE-RUNNERS—See Chasers.

EFFECTIVE LOAD—The effective span in feet mu plied by the weight of the distributed load per foot ru

EGG DEALERS—Hazards are candling eggs and us packing material. See Candling.

EGGS—If eggs are thoroughly wet while in storage t are liable to become spoiled in a short time. Water moves from the shell of the egg a gelatinous covering wh helps to keep air and germs out of the inside of the See Candling; also Consequential Loss.

EGGS, PRESERVING (Facts incident to a fire in a p serving plant)—a Western concern bought up fresh eg

and put them down in a solution for preservation and sale. The solution is a patented one made in Chicago. A fire occurred involving less than 5 per cent property damage, but in putting out the fire some chemicals and water were used by the firemen and some of it got into the solution. Because of this, the manufacturers claimed that a chemical reaction had taken place rendering the solution worthless. In concerns of this character, the solution is insured along with the other property and represents a large proportion of value.

EGYPTIAN LACQUER is composed largely of collodion and is very hazardous. See Lacquer.

EJOO—Called Indian hemp, a black fibre.

ELAENE—See Monylene.

ELAIC ACID—See Red Oil.

ELECTRICITY, properly installed, is the safest kind of light. Repairs or extensions should be made only by experts. Regular examination is necessary to detect defects. Amateurs are responsible for many of the electric wire fires. Electric power is safer than other forms because all the power is transmitted through stationary wires and not rapidly moving belts or shafting which have friction gearing, overheated bearings and which necessitate many floor openings.

When repairing or altering, all old wires or "dead ends" should be removed as they are apt to become charged and cause fire.

A large percentage of the so-called "unknown cause" fires are directly traceable to poor insulation, poor wiring, overloading wires without proper fuses, or poor installation of motors. Overfusing is a common occurrence. Direct current (brush motors) should be carefully protected from dust. Induction motors, while not subject to the dust hazard, should be very carefully wired because the hazards from currents are greater than at brush motors.

Among the **conductors** are metals, charcoal, animal fluids, water, vegetable and animal bodies, flame, smoke and vapor. Among *the non-conductors* (called insulators) are rust, oils, *phosphorus, lime, chalk, rubber*, camphor, marble, porcelain,

dry gases and air, wool, silk, glass, transparent stones, wax and amber. Some of these become conductors when wet.

Defective insulation, such as wires hung on nails, is apt to cause short circuits through abrasion or the wearing off of insulation, the arc setting fire to surroundings. Conduits are the best form of wiring. Wires strung loosely are dangerous and apt to become damaged. Water in leaky conduits and wires in contact with dampness, such as underground wires, cause blowouts.

ELECTRIC ARC—The intensely bright arc produced between two carbon points in air, when a current of electricity passes from one to the other across a gap.

ELECTRIC CABLE DUCTS—See Pipe Shafts.

ELECTRIC DEVICES—The National Board states that 30,000 fires a year are caused by carelessness in using electric devices. A new form of peril is coming into prominence as a cause of much destruction, and its fires are so directly associated with carelessness that it has been deemed necessary to issue a special warning. Because of their convenience small electric devices, such as pressing irons, curling irons, toasters, electric pads or blankets, electric plate warmers and electric sterilizers or heaters, are now to be found in nearly every community. If these were used with proper care the danger would be negligible; but, unfortunately, a proportion of their users do not realize the peril of leaving them in circuit when not in use. In such cases these devices tend to become overheated, whereupon they are liable to set fire to anything combustible with which they come in contact. Most of these fires are small, but the aggregate loss is large, and occasional instances show extensive damage, as in the case of the $350,000 fire in a Boston residence. This was traced to an electric plate-warmer in the butler's pantry. Fires of this class furnish a special peril to life, being most frequent in dwellings, and often breaking out in the night. A characteristic example is that in which an electric pressing iron is left upon the ironing board with the current turned on and then forgotten, for in such a case the fire may not occur until some hours later. It is safe to say that most of these fires are entirely preventable and can be charged

to nothing but carelessness on the part of the user. Various safety devices have been added by certain of the manufacturers of these articles, and among them are some that are fairly effective, but there is one absolute precaution which should be borne in mind at all times by every user, namely, that of shutting off the current when not personally and continuously supervising its use. See Electric Iron.

ELECTRIC HAZARD—In the eyes of the underwriter it is a question of heat and not light. Heat is caused by wires being forced to carry too great a current, therefore it is necessary to find out if wires are overloaded or provided with proper fuses.

ELECTRIC IRON—An electric iron in use in Dayton, Ohio, was left on a table and burned its way through the table, through the flooring, then through a joist that supported the flooring and was found dangling by its wire in the room below without firing the building. This is an unusual case and it is remarkable that a fire did not ensue. Electric irons should have a thermostat switch placed in the iron to automatically cut off the current whenever the temperature exceeds a predetermined point, usually 400 to 600 deg. F. See Electric Devices.

ELECTRIC LAMP SHADES—These shades are made of colored fabric, and have shaped corrugated sides designed to stretch and snugly fit naked incandescent electric light globes with which they come in contact. The use of these shades is fraught with danger as electric light bulbs readily heat sufficiently to ignite material with which they may come in contact. Unsuspecting customers are apt to purchase these shades and install them in their homes for decorative purposes near curtained windows, drapery or other inflammable material where the light might be left burning indefinitely and thereby cause a fire. Rating Bureaus in some cities make a charge in the rate schedule for this feature.

ELECTRIC LANTERNS are taking the place of the oil lanterns in many hazardous industries and places. It is estimated that oil losses from fires amount to $250,000,000 annually, and much of this is caused by the open flame lantern. Oil men have demanded something safer than the

oil lantern and of greater light vitality than the pocket flash light. The electric lantern has met both of these demands. The presence of a flame, however well screened, is a fire hazard in many industries. A person may wade through clouds of gases and fumes with this lighted safety lantern without the least danger of explosion. Fifty railroads have tested it out, and most of them have adopted it.

Oil lanterns cause an average of five disastrous home fires every day. A small child may carry the electric lantern into the attic or down into the cellar without danger. The farmer may use it safely in milking, feeding stock, and doing chores. It may be dropped on the barn floor or overturned in the mow. Had the lantern kicked over by the cow been an electric, the great Chicago fire would not have been. It is safe to use the new light in the garage, or near gasoline stoves. (Fire Protection.)

ELECTRIC MOTOR—A machine by which electrical energy is transformed into mechanical energy to rotate a shaft.

ELECTRICAL SUPPLY STOCK—Work is repairing and assembling fixtures, repairing motors, winding armatures, buffing, soldering and relacquering. Use considerable packing material. Numerous portable electric light wires for displaying domes and globes is a poor feature because the insulation wears off by continuous use and careless handling, and short circuits are frequent. Classed as fair insurance.

ELECTRICAL TERMS—Briefly stated, voltage means electrical pressure; current, the flow of electricity; amperes, the unit of current. Volt is the unit of pressure. Volts multiplied by amperes equal watts which are the measure of quantity. A thousand (kilo) watts are the mechanical equivalent of one and one-third horse power. Lighting circuits usually carry 105 to 120 volts, although some few towns have 220 volt systems.

ELECTRICALLY - DRIVEN MACHINERY — If fire takes place within the machine itself, the fire policy is not liable for such damage to the machinery. If, however, the fire extends to other property, the company is liable for the property so destroyed. If fire starts elsewhere than in the

:hinery, the company is liable for the damage to the ma- ıery.

ıLECTRICITY CLAUSE reads as follows: This entire ıcy shall be void if electricity is used for light, heat or ver in the above described premises, unless written per- sion is given by this Company hereon.

'rivileged to use electricity in the above mentioned prem- ȝ for light and/or heat and/or power, it being hereby made ondition of this policy, that where the equipment is owned controlled in whole or in part by the assured a certificate ıll be obtained from the New York Board of Fire Un- rwriters, and that no alterations shall be made in that rtion of the equipment owned or controlled by the as- red after certificate is issued without notice thereof being ven to the said Board.

Attached to and forming part of Policy No................ the .... Insurance Company.

[Signature for Company] ....

ELECTROLYSIS—The chemical reaction produced by a rrent of electricity. Used commercially in the preparation a great many chemicals.

Electrolysis—The destructive effect upon metals of an ectric current. The most common form is the effect upon ıderground pipes, lead-covered cables, and metal work building foundations. The effect is the pitting or erosion here the electrical current leaves it. Stray currents from ›wer houses seeking return to the power house utilize pes, metal structures and cables in their path (usually be- ıuse the return feeders are of insufficient capacity). The ımage occurs where the current leaves these structures.

Electrolysis (electrolytic corrosion) is disintegration ıused by stray electric currents attacking underground eel work. Where the electrolysis is severe or continuous, may cause the collapse of steel skeleton buildings.

ELECTROPLATES—Inspection should be made to see if ood backed, also whether kept in fireproof vault, in stacks r in boxes. When obsolete are worth so much a pound. If ı use, their value represents the labor of producing them, hich is expensive. On the premises of printers or station-

ers, they may form a large percentage of the value of entire stock. They should be kept in cabinets, safes vaults.

ELECTROPLATING—An electro-deposition process which salts of metals, such as gold, silver, platinum, nic or copper are decomposed by an electric current and a c ing of the metal is deposited on the surface of another ject. Before being coated, the object is cleansed with acid or caustic alkali and then dipped into the bath (a t containing water solutions) where the plating takes pl Dynamos usually supply the current. The metal to plated is connected by a wire with the negative electr The positive pole is connected with an anode of the s metal which is deposited.

ELECTROTYPING—The same principle applies as troplating but it is specially applied to copying print type, medals, seals and wood cuts. See Electroplating. W cuts, half-tones, and zinc etchings are so much in use at present time that it is necessary to describe briefly t manufacture, and also to mention some of the hazards fc in their production. These cuts are sometimes placed in press with other type, as in ordinary printing, but q frequently electrotypes are made from them; this is espe ly true of wood cuts. The electrotype is then placed in press while the original is preserved for future use. In n ing wood engravings, Turkish boxwood is cut into pi of the desired size, and the surface to receive the desig finished smooth. The next step is to have the design picture traced or drawn on the block to enable the graver to begin his work. Sometimes this is done by h but most of this work is accomplished by the use of p tographic negatives. The object to be reproduced is p tographed by means of the negative, the design or pict is printed on the face of the block which has previou been covered with a sensitized solution. Arc lights generally used to do this printing; this makes it unnecess to depend upon the proper weather condition. The engra then takes the design, and with hand tools cuts away th portions of the face of the block which must be removed

produce the design in relief. Nothing but hand tools are used in this work. A "lining" machine is used to produce the fine parallel lines appearing on these cuts. No hazard of much importance presents itself in this business, except that of arc lights, which should be, and generally are, protected by glass globes. Wax kettles are usually steam heated. Hand tools are heated over gas jets or kerosene lamps. Glue pots should be steam heated. Good insurance if hazards are safeguarded.

ELEMI—A composition of resin used in lacquer making.

ELEMINE—Rosin boiled in water containing carbonate of soda.

ELEVATED RAILWAY STATIONS—The old type are generally of light frame construction. Subject to electrical hazard from third rail. Inspect for heating which is usually by coal stoves. Lighting is gas or electric. Smoking should be prohibited, and rubbish should be cleaned up daily. Good housekeeping important. (Lessons from South Ferry Fire, New York City, 1919.)

ELEVATION—In reviewing plans it is the drawing which shows the height of the building with all the stories combined.

ELEVATOR BOOT—The lowest part of a "lofter" or elevator (also termed elevator leg), enclosing the pulley under which passes the carrying belt.

ELEVATOR BUILDINGS—All buildings such as grain elevators, used in the handling of any combustible substance, especially where finely divided dust is liable to be produced, should be built of fireproof materials. Non-fireproof constructed type have a bad loss record.

ELEVATOR HEAD—The opposite end to the "boot" and enclosing the driving pulley. See Strut Board.

ELEVATOR LEG—The narrow, continuous boxing, enclosing through one or more floors a belt-and-bucket or chain-and-bucket elevator.

ELEVATOR MACHINERY—Motors and cable drums are frequently located at the top of elevator shafts, the machinery resting on latticed iron framework. Considerable lubrication is required and unless an adequate metal drip

pan is placed under the machinery, oil and grease may fall upon the elevator car and perhaps passengers. Quite frequently cotton waste, sawdust or paper is used to absorb excess oil and grease. This latter method is a poor feature.

ELEVATORS are used in grain warehouses or breweries to convey grain from one floor to another. They are also used to convey grain from boats to cars. In the latter case, it is called a "marine leg."

EMBOSSERS—Used by wood-workers for pressing patterns on wood in imitation of carving. The machine consists of a plate or roller bearing a design in relief with a device to hold the work to be embossed and another device for heating the plate or roller. Gas heat is generally used, although heating devices by live steam and sometimes gasoline have been used.

EMBOSSING PRESS—Similar to a cylinder press. One type is the revolving press, the revolving portion of which is covered with fine needles which make impressions on the paper. Others are similar to a screw press, in which case a die is used for making the impression. Both are usually gas heated, and flexible gas pipe connections are sometimes necessary unless the "bed" or stationary part of the press is heated, in which case a rigid iron pipe connection can be made. See Printing Hazard.

EMBROIDERIES—Dress goods, lace, netting with braids, cords, spangles or beaded cord are embroidered on a "Bonnaz embroiderer," a type of machine similar to the ordinary sewing machine. The best machines are imported. Hemstitchers, scalloping and imitation hand embroidery machines are similar to the ordinary sewing machine.

A "**braider**" is a circular all-iron machine similar to a knitting machine for making bodies of sweaters. On it round, flat, elastic or soutache braids are woven. The rough edges of braids are singed over a gas flame, alcohol, gasoline or kerosene torch or lamp.

"**Chenille**" machine: a machine designed to make cords, tassels, etc., as used on portieres or draperies, dress goods or millinery trimmings. It is usually of wood, a small affair, the yarn being drawn through the machine to a large

ıeel on opposite side of room, the reverse action of the ıeel and the chenille machine making the twist. The ma- :ine is usually very oily and covered with lint.

Swiss embroidery: Swiss machines are large, 5 to 15 ırds long, motor driven, and weigh 2 to 18 tons, and they ıould always be set on substantial bases, preferably in the ısement or first floors of buildings, the foundation resting ı terra firma. The pattern is placed on a board at one end of e machine, and an operator traces the design with an arm alled pantograph), which also regulates the action of nee- es and punches which embroider the goods. The material stretched along the entire length of the machine. An utomat" attached to a Swiss machine takes the place of e operator. It works on the same principle as a player- ano, having a perforated pattern instead of a music roll, hich makes the design. It is also motor-driven. Oily, lint ıvered motor, oily floor and swinging gas brackets are the ızards of these Swiss machines. Parts for machinery are ıually hard to obtain.

Passementerie is the edging, beadwork, or lace trimmings ır dress goods. It is entirely hand work and presents no aterial hazard.

Stamping is transferring a pattern to the piece of goods) be embroidered. The transferring is done by rubbing a iece of colored chalk, wax or lampblack thinned with ben- ine, over the perforations of the patterns similar to a pounce."

Carbonizing—Braids are frequently sewn on buckram which has been treated with sizing of diluted sulphuric acid. Heat tends to disintegrate the buckram. The goods are placed on a wire mesh over a gas flame in an oven and the heat carbonizes the buckram and leaves the braid intact—a source of danger, unless the oven is properly constructed. Carbonizing is also done by passing a hot iron over the buckram.

Plaiting, Ruching, Fluting and Crimping machines are gas-heated. If the gas connection is of iron there is little haz- ard unless the rollers become overheated.

Bleaching is done with benzoin or hydrogen peroxide.

Cleaning with alcohol, turpentine, benzine or chloroform.

Dyeing is done with aniline colors.

Important hazards are heating of sizing kettles, rubber tubes at gas-heated machines, swinging gas lights at Swiss machines, stamping with benzine and lampblack, and the carbonizing ovens. Very susceptible stocks. Water will streak the goods, cause mildew, or make the colors run. After a fire they should be immediately sorted and dried. Wash embroideries generally yield a good salvage. Imported machinery with necessary loss of time in replacing parts must be considered in "use and occupancy" lines. (W. O. Lincoln, "Live Articles on Special Hazards," The Weekly Underwriter).

EMERGENCY SPRINKLER HEAD SHUT OFF DEVICES are for temporarily stopping the flow of water when a head has fused. They are of various designs and are placed over the orifice and fastened to the frame of the head or by other means.

EMERY AND SANDPAPER MANUFACTURING—Hazards of crushers for raw materials, dry rooms and pulverizing. Paper is coated with glue and by continuous process passes through a steam heated machine where the dust is deposited on the paper.

EMERY GRINDERS—Used for grinding tools, emit a considerable amount of sparks, and fires have been caused by these sparks falling into cotton waste or refuse. The wheels will crack if cold water is poured on them when hot.

EMMENSITE—Made by mixing picric acid with red fuming nitric acid. A powerful explosive.

EMPTY BOXES—All kinds of fire wood, boxes, etc., in yards and alleys should be stacked neatly and kept free from rubbish.

ENAMELS are mixtures of pigments, varnish, oils and japan. Benzine or turpentine is used as thinners. Classed as inflammable. See Japan and Enamel Ovens.

ENCLOSED—Surrounded by partitions to prevent draughts and fires from spreading from floor to floor. See Shafts.

END CONSTRUCTION—As applied to laying terra cotta,

is the same as side construction, except the blocks are laid on ends instead of on sides. See Side Construction.

ENDER—A device for putting ends on paper boxes, by pasting or gluing. Sometimes gas heated glue pots are used.

ENDORSEMENT—A term expressing a change in the original contract of insurance, thus: change of location, name, increasing or reducing amount, etc., are noted on policy and signed by agent or officer of the company. See Change of Interest.

ENEMY ALIEN CLAUSE during the war—A clause was attached to all policies to conform with the provisions of the "Trading with the Enemy Act," an Act of Congress.

ENGINE OILS—Flash point 300 to 400 deg. F. Animal or vegetable oils are only used in mineral oil compounds. (No fire hazard.)

ENGLISH BASEMENT HOUSE—Generally there is an open areaway in front of the basement, and basement is practically all below the level of the street, the first or parlor floor being only one or two steps up from street. If the number of steps up to parlor floor is more than those to basement, the building is then called a High Stoop Dwelling.

ENGRAVERS use plate printing presses somewhat similar only much larger than transfer presses in printing risks. To keep the ink warm a gas jet is generally used, but kerosene oil lamps may be found. Use of kerosene oil lamps should be discontinued. Benzine is used for cleaning. Metal should be placed under the presses. Oily waste to be kept in safety can.

ENVELOPE MANUFACTURING—Hazards are similar to paper-box factories with printing and gluing. Care of clippings important.

EPSOM SALTS—See Sulphate of Magnesia.

EQUAL TO—An insurance term meaning the adjoining building is higher, therefore being equal to a parapetted wall. A very high ceiling building or story of a building, such as a church, may be described as being one equal to two (or more) stories in height.

ERADELINE—Flash point 100 deg. F. Classed n volatile.

ERADICATOR PAINT OR GREASE may contain et gasoline, alcohol, acetone, etc.

ERROR AND OMISSION POLICIES are someti written to protect a warehouseman should he neglect insure the goods in his charge. No co-insurance claus required. This kind of insurance is not acceptable to m companies. The form should read: On merchandise, property of others, while contained in the building inc ing any and all additions and extensions, situate] .... City. It is agreed that if by re of fire, any of the above described property being dam or destroyed by fire, the assured being held liable for on account of any **error or omission** of himself or his ployes, this Company shall be liable to the assured fo amount not exceeding the assured's liability nor for amount in excess of the insurance hereunder.

ERWIN AUTOMATIC EXTINGUISHING OUTFI For extinguishing oil or naphtha fires in tanks. Briefl white foam is ejected on the surface of the burning m rial from standpipes containing a chemical solution. A l lined thimble containing acid is closed with a fusible which in burning allows the thimble to fall in the chem solution in the standpipe and the chemical mixture is fo out under pressure.

ESCALATOR—A moving or traveling stairway. As t are generally open, fires travel swiftly through them.

ESPARTO FIBRE—A grass from Spain. One of worst of the fibre class. It is almost impossible to exting when on fire. Said to be subject to spontaneous coml tion.

ESSENTIAL OILS—Liquids which give the odors p liar to plants from which they are derived, or are produ by the combination of substances in the plant which r when brought into the presence of water. They have str odors, and are generally volatile. Fires in this class b fiercely.

ETCHING—A process of engraving by means of hy

fluoric, nitric or hydrochloric acid. If glass, hydrofluoric acid only can be used.

ETHER—Prepared by distilling alcohol and sulphuric acid in retorts. It is volatile, highly inflammable and when mixed with oxygen it explodes. Flashes at 29 deg. F.

Petroleum Ether—Very light and volatile petroleum distillate. Used as a solvent. More inflammable than gasoline.

Sulphuric Ether—Highly inflammable and volatile. Flashes at zero F. Made by treatment of alcohol with sulphuric acid.

Spirits of Nitrous Ether—More inflammable than alcohol.

ETHEREAL OILS—Spirits of an oily nature or very fine oils. When in contact with a flame they take fire instantly. Inflammable.

ETHYL ACETATE—See Acetate of Ethyl.

ETHYL ALCOHOL—See Alcohol.

ETHYL CHLORIDE—A gas at ordinary temperature. Stored under pressure in small tubes and used by dentists for freezing purposes. Not as hazardous as ether. Volatile and inflammable. Boils at 55 deg. F.

ETHYLENE—A colorless gas which burns with a luminous smoky flame. Forms a highly explosive mixture with air or oxygen.

ETHYL-METHYL KETONE—A colorless inflammable liquid. Flash point 30 deg. F.

ETHYL NITRATE—A thin yellow liquid. Volatile and inflammable. May ignite spontaneously at 194 deg. F.

ETHYL NITRITE—When mixed with alcohol is used in medicine as spirits of nitre. Inflammable. Boils at 63 deg. F.

ETHYL OXIDE is ether.

ETNITE—A powerful blasting powder.

EUCHLORINE is a mixture of oxide of chlorine and chlorine. It is volatile and explosive.

EVAPORATING—See Crystallizing.

EVAPORATION—The conversion of a liquid into a gaseous state by action *of heat.*

EVERITE PRESSOLINE—A benzine substitute, classed as non-volatile.

EVIDENCES OF DEBT—Cannot be insured. See Uninsurable Property.

EXAMINER—One who examines and passes on the risks submitted by special agents, or agents through a daily report system. He is an underwriter and should have a good knowledge of building construction and hazards. See Counterman.

EXCELSIOR, if damp, is subject to spontaneous combustion if the natural sap still remains. It is used for packing material and burns rapidly owing to large amount of air space. A standard packing bin, 64 cubic feet, with self-closing cover and entirely lined with lock-jointed metal should be used for storing this material. Where used on more than one floor, a separate bin should be provided for each floor. In addition to material in bins, not more than 5 unbroken bales may be stored.

EXCELSIOR IN BALES is usually bound with wire. A small fire will only burn the outer edge of the bales. If a large volume of water is thrown on the bales as would be the case in a large fire, the bales are apt to burst from expansion. When broken, the excelsior is strewn about and a fire will travel rapidly over the loose material. Firemen usually rip open the bales to extinguish hidden sparks, and scatter the loose excelsior in yard or street. Unless carted away, subsequent fires are apt to occur by reason of mischievous boys, locomotive sparks, or carelessly thrown cigarettes. Excelsior warehouses should not be located along the line of steam railroads where there is any chance of sparks gaining access to the building. The wires of bales become brittle if heated and then wet as from a hose stream and if the bale is thrown violently to the ground the wires will snap.

EXCELSIOR PADS are not packed as solidly as baled excelsior and the bundles are usually tied with heavy twine. When thoroughly wet, the bundles will expand, break the twine and scatter the pads about, offering ready fuel for *the fire.*

EXCEPTED PROPERTY—See Uninsurable Property.

EXCESS INSURANCE—Generally taken out by large concerns and the policy is not effective except for that portion of a loss which is in excess of the sum of any other insurance applying, or for a loss in excess of a certain amount.

EXCHANGES—See Motion Pictures.

EXCLUSIONS—Certain portions or kinds of property permitted by the companies to be excluded from the cover of their policies, such as foundations below the level of the ground, chimneys or stacks standing detached from buildings, personal property in which the interest of the insured is not that of entire ownership, etc., etc. These exclusions are carefully limited because, if not, the insured would seek to exclude as much low-damage value as possible from the requirements of co-insurance, leaving the high-damage values for the companies to meet losses upon. Uniformity rules at this time permit the following to be excluded:

Brick, stone or concrete foundations, piers or other supports which are below the under surface of the lowest floor of basement or basements or, where there is no basement, which are below the surface of the ground.

Brick, stone or concrete chimneys or stacks detached from building.

Contents of safes and vaults if specifically rated.

Cost of excavations.

Patterns, models, drawings, negatives, pictures and works of art.

Personal property in which the interest of the insured is not that of entire ownership.

Piling for buildings or piling for wharf property not extending above low water mark.

Underground flues, pipes or drains.

Water wheels.

EXIT DRILLS—In school, factories or elsewhere are necessary as a safeguard against panic.

EXOLIUM—A benzine substitute. Flash point above 100 deg. F.

EXPANDED METAL—A steel plate slit in one operation

and pulled and enlarged into diamond or other shape meshes. Also slotted or punched steel plates.

EXPERIMENTS or experimental workshops or manufacturing risks should be declined unless their objects are clearly understood. In case of failure, the insurance collected is often all that is back of the enterprise.

EXPLOSION—When gas or vapor is released so suddenly as to cause a loud noise, an explosion is said to occur, as for instance, the explosion of a steam boiler or a cylinder of compressed gas. Great and increasing use is made of explosive processes in gas, petrol and oil engines for driving machinery of all kinds. In these engines, the material that explodes is a mixture of air with combustible gas, vapor or finely comminuted liquid and, in the explosion, these are suddenly converted into water vapor and the oxides of carbon, which latter are gases. Although all these things are liable to explode, none of them are called explosives; this term is confined to liquids and solid substances which produce much more violent effects than exploding gaseous mixtures, because they occupy much smaller volumes originally. (A. Marshall.) See Velocity of Explosions.

EXPLOSION (Black Tom)—New York Harbor, July 30, 1916. Two explosions resulted from a fire that was started maliciously or accidentally among freight cars that had been placed on the terminal tracks of the Lehigh Valley Railroad at Black Tom preparatory to a transfer of their contents to barges for export movement. The more severe of the two explosions occurred on the land and involved about 400,000 pounds of dry trinitrotoluol packed in wooden cases, while the second explosion on the water involved 100,000 pounds of dry picric acid. Black Tom was occupied by the warehouses of the National Storage Co., and the Lehigh Valley Railroad had therein its office, float bridges and tracks. Practically all of the brick warehouses were demolished by the explosion. As explosives are essential in peace as well as in war, and must be transported, all restrictions that promote safety and are practicable must be enforced; in other words, uniform regulation by the Federal government of the water as well as the land carriers of

angerous articles. Ocean going ships must sacrifice more f their conveniences to the cause of safety in tidewater erminals. (Extract from Bureau of Explosives report.)

EXPLOSION—The standard policy states: "This Company hall not be liable for damage occurring by explosion or ghtning unless fire ensues, and in that event, for loss or amage by fire only." Just when and where fire damage arts is a question which is illustrated by the following:

Caused by Explosion, Mar. 30, 1918

Fire started by a cigarette thrown into chemicals scattered om sacks in the Jarvis warehouse in Jersey City on Tuesy afternoon caused a terrific explosion or series of blasts at demolished that plant and damaged railroad properties joining, with losses to rolling stock and repair shops.

Whether the loss will be considered an explosion or a e loss is a question upon which company men are loath commit themselves. "The companies will pay whichever was," said a prominent underwriter this week. "There has yet been no litigation which determines what an explosion s is, as differentiated from a fire loss and there is nothing guide companies in such cases. The only safeguard an derwriter has, is to carry lines on both classes of insurance, t the premiums and pay the loss if it occurs. After an plosion of a destructive nature occurs, accompanied by e, it is practically impossible to differentiate between the s caused by fire and that caused by explosion, whichever ppened first."

EXPLOSION INSURANCE—Policies cover property nage due to explosions of every nature, except from ilers and flywheels, originating within such apparatus. This urance is covered by casualty companies only.

Form reads as follows: On all buildings of their manuturing plant, including chimneys, also sprinkler tank and tures, and yard hose houses, all situate.................

....

d on the contents thereof, therein or on premises above scribed, against the risk of loss or damage to such propy (except as herein excluded) caused by explosion

occurring during the term and under the conditions of this policy.

This policy also covers machinery or stock belonging to others which the assured are under obligations to keep insured; also machinery or stock consigned to them or held by them in trust or on commission, or sold but not delivered by being removed.

Glass Breakage Clause

This Company shall also be liable for loss and/or damage to glass which may be a part of the buildings insured, to an amount, however, not exceeding 10 per cent of the value of such buildings; subject in all other respects to the printed conditions of this policy and/or conditions attached hereto, but in no event shall this Company be liable for a greater proportion of such loss or damage than the amount which this policy bears to the total amount of all similar insurance whether or not such other insurance shall include liability for loss or damage to glass.

Other insurance permitted without notice until requested.

Exclusions

This policy does not cover loss to said property caused by order of any civil authority to retard or arrest the progress of a conflagration; nor loss to property on which there is specific explosion insurance; nor loss to any automobile which may be within the premises of the assured.

This Company shall not be liable for loss or damage recoverable under any fire or other kind of insurance contract.

Warranted; that this Company shall not be liable for any explosion originating from any materials and/or processes incident to the business. Note.—If this clause is eliminated, the rate is increased according to occupancy.

Co-insurance Clause

In consideration of the rate and form under which this policy is written, in the event of loss this Company shall be liable for no greater proportion thereof than the amount hereby insured bears to fifty (50) per cent of the actual cash value of the property described herein at the time when such loss shall happen, and for no more than the proportion

which this policy bears to the total insurance thereon. In the event that the aggregate claim for any loss is both less than ten thousand dollars ($10,000) and less than five (5) per cent of the total amount of insurance upon the property described herein at the time such loss occurs, no special inventory or appraisement of the undamaged property shall be required. If this policy is divided into two or more items, the foregoing shall apply to each item separately.

Attached to and forming part of policy No..........of the ....Insurance Company of.................

...........................Agent.

Allowance made for 80 per cent co-insurance.

EXPLOSIONS from static electricity. See Static or Frictional Electricity.

Explosions such as occurred at Morgan, N. J., when a large amount of explosives detonated, have a far reaching effect. Every brick chimney within a long radius was cracked. After such explosions all chimneys within the shock area should be examined for possible fissures.

EXPLOSIVE—An explosive is a solid or liquid substance, or mixture of substances, which is liable, on the application of heat or a blow to a small portion of the mass, to be converted in a very short interval of time into other more stable substances, largely or entirely gaseous. A considerable amount of heat is also invariably evolved and consequently there is a flame. (A. Marshall.)

EXPLOSIVE GELATINE is about 90 per cent nitroglycerine and 10 per cent gun cotton.

EXPLOSIVE VAPOR—See Induction Motor.

EXPLOSIVES should be stored in a dry, well-ventilated place, not warmer than 80 or 90 deg. F. They should be kept under lock and key, so that children or irresponsible persons cannot have access to them, and should not be stored in locality where hunting or other shooting may be done, unless they are kept bullet proof. Most high explosives freeze at a temperature between 45 and 50 deg. F. and when frozen will either explode imperfectly or not at all. Low explosives are exploded by a spark; but a spark will not *explode high explosives,* although it may ignite them, and

the heat and pressure caused by burning in a confined space may result in an explosion after a time. High explosives can only be properly exploded by a powerful shock. This shock is brought about in their use by exploding a detonator inserted in the charge of explosives. This detonator is either a blasting cap, which is exploded by a spark from a fuse, or an electric fuse (pronounced fu-zee) which is exploded by a fine wire superheated by an electric current. See Dynamite.

Explosives—If fireworks, Greek fire, phosphorus, explosives, benzine, gasoline, naphtha or any other petroleum of greater inflammability than kerosene oil, gun powder exceeding 25 pounds or kerosene exceeding five barrels are kept, used or allowed on the premises, the insurance company is not liable unless agreement in writing is endorsed thereon.

EXPORTER—Ordinarily we would consider an exporter simply as one who exports goods. The "trade" knows another "exporter" who is a combination of a factor and a jobber. He establishes, in a sense, credit for foreign firms whose representative is unknown or whose credit has not been established, thus enabling the foreign firm to purchase goods in the domestic market without cash. For instance —John Doe of Brazil arrives in New York City. He desires to purchase a line of hosiery which he can secure at a reasonable figure. He secures a letter of introduction from the "World Export Co." who knows him. Armed thus, he visits the hosiery house, presents his own business card and orders the goods sent to and billed to the "World Export Co." This latter concern receives the goods, charges it to John Doe, packs it ready for export shipment. When John Doe wants the goods shipped to himself at Brazil, he notifies the Export Co. and pays his bill when the goods have been shipped. The Export Co. is virtually and in fact the owner of the hosiery, having paid the hosiery concern the amount of purchase. To make a profit, the Export Co. charges John Doe interest on the money advanced, plus a charge for packing and shipping plus a commission on the purchase. If the Export Co. has a chance to sell John Doe's goods at a profit, they may do so with his consent, charging a com-

mission for the sale. As the occasion presents, the exporter buys up goods as a jobber and resells them. This is simply one of the phases of the foreign credit system, enabling foreign trade to purchase goods on credit.

EXPOSURE (EXTERNAL)—A condition, structure or material which increases the hazard of a risk through burning or exploding. It defines the likelihood of a building becoming ignited without its walls. The exposure depends upon the width of streets or alleys, the space between buildings and the nature of the construction and occupancy of such buildings. The hazard may be reduced by the use of standard wire glass windows, shutters, doors, skylights and outside sprinklers. About one-eighth of the losses are caused by exposure fires.

The importance of noting all exposures, window protection and occupancies, is sometimes underestimated. The exposures sometimes have such occupancies that in case of fire would produce a heavy smoke which might injure coffee, cigars or other susceptible goods in buildings adjoining or nearby. Even moisture sometimes will sweat through a wall causing damage to susceptible stock piled against the wall. Where such exposures are present, lines should be written accordingly. The best protection against exposure is a solid blank wall and while this is sometimes unpracticable, except in warehouses, the next best protection would be wire glass windows in hollow metal frames and automatic tin clad fire shutters arranged to close by means of a fusible link. Such a protection as this kept a fire from entering several important buildings in the path of the Salem conflagration. Where both wire glass windows and shutters are not present or are impracticable, either one or the other would offer fairly good protection.

Inspectors should carefully note all exposures, the distance away and whether outside openings of risk are protected by labelled wire glass windows or standard shutters. The following is the fire record of exposure fires in Greater New York as taken from the New York Board of Fire Underwriters' report:

BUILDING—

Year	Insurance	Loss	%
1910	$ 6,362,822	$169,468	.026
1911	10,811,063	148,507	.014
1912	14,742,149	171,442	.011
1913	6,862,499	98,781	.014
1914	11,422,651	82,344	.008
1915	8,181,076	52,782	.006
CONTENTS—			
1910	4,684,224	263,327	.056
1911	8,567,924	350,289	.04
1912	5,729,133	738,799	.13
1913	3,624,729	234,220	.064
1914	2,422,303	150,697	.062
1915	1,601,119	45,823	.020

EXPOSURE (INTERNAL)—The hazard due to exposing the property of one or more tenants of a building to the danger of fire spreading from the premises of another tenant in the same building. In rating, the internal exposure is the most hazardous occupancy; as paper box making, painters or carpenters, and it increases the rate of building and of other less hazardous tenants.

EXPRESS OFFICES AND DEPOTS—Frequently old or dilapidated buildings of various construction. Hazards of unsafe heating and lighting appliances, miscellaneous storage, including chemicals and explosives, smoking by employees, and place used as a "hang-out." See Legal Liability.

EXTENSIONS—See Additions.

EXTINCTION OF FIRE—The danger in every fire, however small, is the generation of heat and gas. When the mass of incandescent matter is large, the amount of air is rarely sufficient to complete the combustion and carbon monoxide is produced and the increase of temperature increases the proportion of carbon monoxide to carbon dioxide. As soon as the fire fighting facilities are present, *openings should* be made at the highest part of building

(such as skylights over shafts) to allow the heated gases to escape.

EXTINGUISHERS (Calcium Chloride)—Used in places where low temperatures prevail, which would freeze the chemical extinguishers of the bichloride of soda-sulphuric acid type. Ordinarily a strong solution of calcium chloride and water is used. One type contains a metal cylinder of carbon dioxide gas which is pierced by a metal plunger at the top of the container, allowing the escape of the gas which forces the liquid out. Another type has the carbon dioxide gas in a sealed glass bottle which is broken by a plunger. If the gas escapes while the extinguisher is not being used, the pressure of the gas is reduced in the cylinder, and if this loss of gas is not detected and remedied, it may render the extinguisher inoperative. Should not be used on electrical machinery See Foam Extinguisher.

Carbon Tetrachloride (base) Extinguisher—Brass or iron cylinders usually holding one quart of solution and operated like a pump. Another type contains compressed air which forces out the liquid by opening a pet-cock on the nozzle. Does not freeze except at extremely low temperature. Useful at electrical machinery as the solution is a non-conductor of electricity. When applied to oil fires, it has a tendency to cast a blanket of gas over the burning oil which excludes the oxygen. If used in the open when wind is blowing it is not so efficacious.

Chemical Fire Extinguisher—Soda and Acid Type. There are two types—one operated by inverting the container which causes a stopper to fall out of the bottle containing the sulphuric acid which comes in contact with the bicarbonate of soda creating carbon dioxide gas. The gas creates pressure which forces the water out of the nozzle to a distance of 20 to 30 feet. To stop the flow of water, the cylinder is righted. The other type is not inverted. By turning a wheel at the top, a screw crushes the glass bottle containing the acid, causing the same result as above. This solution will *freeze. Should* not be used at electrical *machinery as the stream* of water is a conductor and the

electrical current will flow back to the operator with disastrous results.

A standard extinguisher would deliver a jet at about 50 pounds pressure some 20 or 30 feet for about two minutes. The usual charge for a two-gallon appliance is one pound of bicarbonate of soda, dissolved in water and 4 oz. of sulphuric acid. See Foam Extinguishers.

Dry Powder Extinguishers—Their use is not encouraged as they are inferior to water or chemicals. Composed of about 85 per cent bicarbonate soda and 15 per cent iron oxide, silica, starch, fuller's earth, and venetian red; yellow ochre is added to prevent caking. Will cake in damp places and powder may lose its strength. They are, however, better than frozen water pails in unheated buildings.

Foam Extinguishers are made in sizes approximating the soda-acid type, and operated by hand. Used in fighting oil fires. The liquid forms a thick coating of foam on the surface of the burning oil. A solution of aluminum sulphate is used in place of sulphuric acid and an organic liquid extract is mixed with the solution of bicarbonate of soda. It is operated by inverting the container. Should not be used in low temperatures nor at electrical machinery. See Oil Tank Fires.

Foamite—Hand fire extinguishers of the pail type made of iron or steel and are operated by throwing liquids from pail. A tank extinguisher is also made and in which the two foamite chemical solutions are retained separately in storage tanks, from which, in case of fire, they are pumped separately, in equal volumes, through pipe lines to mixing chambers, manifold sets, semi-automatic heads or hose stations with combination nozzle sets, in which the solutions combine and from which resulting foam is applied —

EXTRACTION PLANTS, NAPHTHA PROCESS—(C seed works, and Refuse Disposal plants). Walls should heavy common brick with light corrugated iron ro Screened openings should be provided at floor levels *carry off vapor.* Lighting by incandescent lamps with mar *type vapor-proof* globes, all wiring in conduit with scr

joint junction boxes and marine type fittings; no switches should be permitted in the building.

The naphtha tank should be buried underground outside of the building line.

The Process—The meats from the oil works are brought into the extracting building and dropped into bins having spouts feeding into the extractors. These are cylindrical steel drums having stirring arms rotated by shaft and gearing. The bottom of each contains a perforated metal false bottom under which are located a copper pipe, steam heating coil and a perforated steam jet coil. Charging doors are located in the top through which the meats are fed, and discharge outlets provided in the sides near the bottom. There are also pipe connections for the naphtha at both top and bottom connecting with vaporizers and discharge tanks, all of which are enclosed vessels. The extractors are partly filled with the meats and then hot naphtha vapor passed through same, then through the extractors in series, the naphtha vapors forming a solution with the oil. The mixture is pumped from the extractors into a receiving tank and steam is turned into the heating coils in extractors, the vapor from same being condensed in suitable condensers. Live steam is then blown into extractors to remove as much of the remaining vapor as possible. This is also condensed in the condensers. The discharge doors of the extractors are then opened, and the extracted meats dropped into a screw conveyor from whence they drop into another conveyor and are returned to the oil mill plant. The balance of the operation of obtaining the oil from the naphtha and entrained water, is one of settlement where the water separates through difference in specific gravity and is then drawn off and distilled, the mixed vapor and oil being introduced into a still heated by steam, the naphtha vapor distilling off and being condensed, the oil remains. The process is hazardous. See Garbage Reduction Plants.

EXTRACTS—See Flavoring Extracts.

F

FABRIKOID—A kind of oilcloth.

FACE MASKS—Are made of gauze which has been sized with glue or starch. They are formed in gas heated blocking presses (the same as used in making hats) tinted with aniline colors, holes cut for eyes and mouth with cold or gas heated die presses and face colorings applied by air brush and by hand. The whiskers are jute or other fibre dipped in coloring matter and sewed on by machinery. Some firms use a benzine thinned paint, and also wax the surface of the mask. Hazards constitute storage and handling of jute, direct flame heated size and wax kettles, coloring by hand or air brush, gas heated blocking presses Hazardous process.

FACING in building construction; a wall or surface covering of stone or similar substance on the outer wall.

FACTORS—A firm or individual who acts as a bank for, or a backer of, another firm or person by advanci money to buy goods or carry on a business. Usually fou in wholesale woolen, piece goods or dry goods busines

FACTORY—According to the Bureau of Fire Prevent a factory is in substance any mill, workshop, or other m ufacturing or business establishment, and all buildi sheds or other places used in connection therewith w one or more persons are employed at labor. No smoki permitted in factories in New York City.

Factories—According to the fire policy, if they to be operated beyond a period of 10 days, the insura null and void, unless agreement in writing is attached to. See Night Work.

FAIR GROUNDS—A group of hastily and flimsil *structed frame* buildings of varied occupancy, such as

ing galleries, stables, live stock pens, lunch rooms, display rooms, demonstrating machinery, and race tracks. Temporary occupancy and are on leased land. Not considered desirable insurance.

FALLING WALL HAZARD—Most rating organizations add a certain charge for this feature; sometimes a percentage of the rate of the exposing risk is taken. Experience shows that in case of a severe fire in a high exposing building with a separated distance, the lower building so exposed is liable to be destroyed by falling bricks and débris. See Wind.

FALL OF BUILDING—According to the New York Standard policy, should a building or any material part thereof fall except as a result of fire, all insurance on the building and its contents shall immediately cease.

FALSE SWEARING—See Misrepresentation.

FAN LIGHT—A window containing a sash with bars radiating from the middle of its base like a fan.

FANCY LEATHER—See Leather.

FARM—At piers, is the open space in front of the pier used for open storage of merchandise.

FARM IMPLEMENTS—See Agricultural Implements.

FARMS have been considered as unprofitable insurance by many large companies. Hazards include the use of gasoline stoves or engines, incubators and brooders, feed grinding, lighting by acetylene gas systems, wood burning furnaces, evaporating fruit in a room with red-hot pot stove, garage, threshing machines and unsafe heating apparatus. Stove pipes through floors to heat upper rooms are quite frequently found. In place of scalding hogs with steam, farmers have been known to sprinkle gasoline on the carcass and set it on fire. The quick flash burns off the hair without damaging the hide. Electric power is reaching its hand far into the rural districts, and many farmers are either supplied with electricity from the cities or they have individual plants of their own. With the individual plant in the farmhouse is a gasoline engine and its accompanying hazards. Electrical wiring may be properly done when the power is installed, but there comes a desire to extend the

wires to a dark cellar or to an attic. The owner tries his hand at the wiring. Cases are reported of wires twisted around nails and strung upon unprotected metal.

Many groups of farm buildings are so located and constructed that any fire which might break out in one building would be almost sure to destroy the whole group. When a new building is to be erected it is worth while at least to consider placing it where it will be reasonably safe from fire starting in any other building and where it will not be a menace to other buildings.

FARRIERS—See Blacksmiths.

FASCIA—A facing or band of stone used on the front of a building.

FAT RENDERING—Plants buy fat from butchers and deposit same into steam jacketed (covered top) rendering kettles with agitators. The liquid (tallow) derived therefrom is run to a covered sump pit from which it is pumped to a tank on the floor above. The residue or waste material is removed and placed in hydraulic presses and pressed into cakes. The cakes are then placed in a power grinder and made into chicken feed or used as fertilizer. Hazardous. Entire premises is usually oil soaked.

FATIGUE OF MATERIALS—The increased weakness produced by frequent bending or by sustaining heavy loads for a long time.

FEATHERS AND FEATHER PILLOWS—Feathers are sorted in a sorting machine, cut up in a high speed knife cutter equipped with a blower system which draws the feathers through a suction pipe to a duster, thence to the storage bins. Bins are usually of wire mesh on wooden frames. The lighter feathers are deposited on the upper portion of the bins and the heavier feathers fall to the floor. The pillow cases are then filled and sewed up. Cotton is sometimes added, in which case a cotton picker may be used. Considerable dust lays about premises. Knife cutter should have magnets to catch metal particles. See Flowers and Feathers. See Ostrich Feathers.

FELT—A rather coarse fabric or cloth treated with resin.

s made of fibres of hair, wool, coarse paper, etc., by ssure and not by weaving.

elt (roofing) is sometimes made from the refuse of flax ited with resin.

'elt (cotton) in bales is considered subject to sponta- ous combustion.

'ELT PACKING—As used for automobiles and electrical chinery is about 80 per cent wool and 20 per cent cotton. e hazards of making this packing are cutting, stitching and ing. These are usually good risks, unless the felt is nufactured on the premises.

'ENCE—A place where stolen goods are bought and sold. oss adjusters and Salvage Corps try to locate them and us recover goods claimed to have been destroyed by fire.

FENCES—If of slatted wood, especially along the line of am railroads, are considered poor risks. Fires have been own to start at one end and burn for miles.

FERMENT—To allow moistened organic matter to un- rgo a process of decay.

FERMENTATION—A chemical action brought about by e action of micro-organisms or "ferments."

FERMENTED LIQUORS—See Liquors.

FERRO-ALLOYS are such materials as Ferro-Chrome, rro-Manganese, Ferro-Molybdenum, Ferro-Silicon, Ferro- ngsten, Ferro-Uranium, Ferro-Vanadium and Ferro- conium.

'ERRO-MANGANESE is imported from England. With- it some kinds of steel cannot be made. Produced from s of iron and manganese in high temperature smelting nace. Has no fire hazard.

'ERRO-SILICON—Compounded of iron and silicon. n-hazardous. Has no fire hazard.

'ERRY BOATS—Should be inspected. Lines are usually ered on the old wooden hulls rather than on the modern e of steel hull.

'ERRY HOUSES of frame construction are apt to be a al loss. If barnlike construction, they burn rapidly. Haz- ls are oil rooms and lamp filling, repair shops, baggage oms, lunch rooms and heating apparatus.

FERTILIZER—The commercial mixed varieties have very little fire hazard when packed and ready for use.

Fertilizer from fish scrap and crabs. Process—boiling in digesters where all unused agents are removed, drying residue and reducing same to carbon in high temperature dryer, ground and bagged. Subject to spontaneous combustion by absorbing oxygen very rapidly.

Fertilizer from meat or fat constitutes a grease hazard with rendering of refuse meat and fats, and bone grinding, use of filter presses, cake pressing (pressing the solids into cakes) and drying. Entire premises is usually grease soaked.

Phosphate fertilizer making may include the manufacture and use of sulphuric acid and saltpetre. Empty saltpetre bags are dangerous. A chemical hazard. A K. O. Class.

FIBRES are divided into two classes, **hard and soft.** Hard fibres, by virtue of their construction, do not absorb water rapidly when immersed and do not heat or decompose as rapidly as soft fibres which, when damaged, must be picked apart and dried at once if any salvage is to be expected. The largest losses are caused by the collapse of the building due to the swelling or expansion of the soft fibre from the excessive absorption of water. Spontaneous combustion is not attributed as the cause of these fires. When wet will expand and burst the ordinary fibre bindings and perhaps push out the walls of a building. Firms who have studied fibre for years claim that by piling the bales in courses like a brick wall, one header course and one stretcher course, the water (as from a sprinkler) cannot flow down through the interstices and cause swelling, also if a fire occurs and water does drench the pile, the expanding fibre will reduce the air space and thus prevent a fire from spreading to the interior of the pile. Before being worked into rope or bagging, all fibres are soaked in water, hence very little water damage will result from a fire in the fibre if it is immediately dried to prevent rot. (T. E. Sears). See Bagging Factories.

Fibres by themselves and oils by themselves as a rule do *not constitute* a hazard. When they are combined the

ɩe starts. Consequently the blame has to be divided :en them. The fibres take their share because they 'b the oil and spread it over a large surface where it nes exposed to the action of air or oxygen and oxida- begins. The fats and oils, on the other hand, generate an amount of heat that the readily inflammable fibres rb and retain this heat and then take fire. This brings ack to our friendly enemy, the oxygen, and when all is and done, it is really to blame when spontaneous :ion occurs.

ard Fibres—Manilla, Sisal, Henequen, Maguey, Mescal, :, Zapupe, New Zealand, Mauritius, Caburya.

ft Fibres—Hemp, American, Italian, Russian jute, Sunn, :.

emp Fibres of all kinds are destroyed if exposed to a : of 300 degrees F. Hemp is an annual plant of the mul- y family, a native of Asia. Classed as a soft fibre.

aburya—A fibre produced in Costa Rica and sometimes :d Central American sisal; used for binder twine. Classed ard.

lax is a native of western Asia. Used chiefly in the ufacture of linen sewing thread, fishing lines, etc. Classed oft fibre.

enequen is a native plant of Mexico, known in the trade isal. It belongs to the same botanical family as the true . Classed as hard.

tle—A fibre grown on the high, arid tablelands of north- Mexico. The fibre is shorter than the henequen plant. sed as hard.

te is a base fibre, growing principally in India. Used fly in rugs, grain sacks and binding twine. Classed as

aguey is a comparatively new fibre on the market, and roduced from the leaves of the Maguey plant, which closely resembles the henequen of Yucatan. Classed as .

nilla Hemp—Known as Manilla or Abaca, is grown :ipally in the Philippines. Classed as hard.

Mauritius—A hard fibre obtained in the island of Mauritius. It is white in color and more flexible than henequen. Classed as hard.

Mescal Maguey—Similar to henequen, finer and softer, produced in Mexico. Used chiefly in cordage and twine mills on the Pacific coast. Classed as hard.

New Zealand Flax—Sometimes called hemp, is not at all like wither hemp or flax, but is obtained from the leaves of a native plant of New Zealand. Classed as hard.

Sisal—The true sisal is taken from the leaves of the sisal plant, a native of Central America. Classed as hard.

Sunn Hemp is a base fibre from an annual plant and also known as Conkanee, Indian, Brown and Madras hemp. Used in manufacturing cordage. Classed as soft.

Zapupe—A fibre which grows in loamy soils and with more moisture and less lime than seems necessary for good results with henequen or sisal. Classed as hard.

Zea Fibre—Used in paper and cordage manufacturing.

FIBRE WAREHOUSES for the storage of cotton, hemp, sisal, etc., are especially designed. For charges made in rating, see New York Exchange Cotton Warehouse schedule. Buildings should be low, one-story brick buildings, with walls parapetted and coped and areas restricted, limited window openings, walls blank wherever possible. The height to which cotton bales may be piled is restricted, and clear aisle spaces are demanded. See Warehouses.

FIBREBOARD—Made from leather chips, flux, old rope, paper, wood pulp and similar material, ground, cooked by steam in solution of alkalis, mixed with binder of such material as glue or rosin, colored, pressed into sheets, dried and varnished or stained. See Chemical Fibre; see Compo-Board.

FIBRELOID—Trade name for a nitro-cellulose compound.

FIELD FIRES—See Grain Fires.

FILBERTS—See Nuts.

FILLERINE—A fertilizer ingredient made from iron oxide. Liable to ignite spontaneously.

FILLERS—Used by woodworkers, and are made of vari-

combinations of silax, silver white, cornstarch, whiting, er Paris, raw and boiled linseed oil, turpentine, japan benzine.

LLET—A strip of wood nailed to the header beam of a ace as an additional support to the hearth. Also used of moulding and for other building purposes.

LM OIL—A compound consisting mainly of fish oil, mineral oil and China wood oil. It is about the conncy of light lubricating oil and is used as a substitute inseed oil in the manufacture of paints. Not volatile.

LMS—See Motion Picture Films.

LM VAULT (Test for Ventilation)—By F. J. T. Stewof N. F. P. A., 4-22-'15, Leonia, N. J.

structure of 12-inch terra-cotta blocks having 133 cubic was vented with a side opening 285 square inches and 1 with films on shelves in and out of cans and space veen racks filled with loose films and ignited with elecspark, 1800 pounds of film in all. The tongue of flame ch shot out from the vault almost immediately after ignition of the film projected itself 75 feet, continuing several minutes, or until all the gases generated within vault were consumed. The vault was undamaged, provthat the area of ventilation provided was undoubtedly cient to prevent explosion from the rapid decomposition lm under similar conditions. See Motion Picture Films.

LTER CLOTHS should be washed immediately after g used.

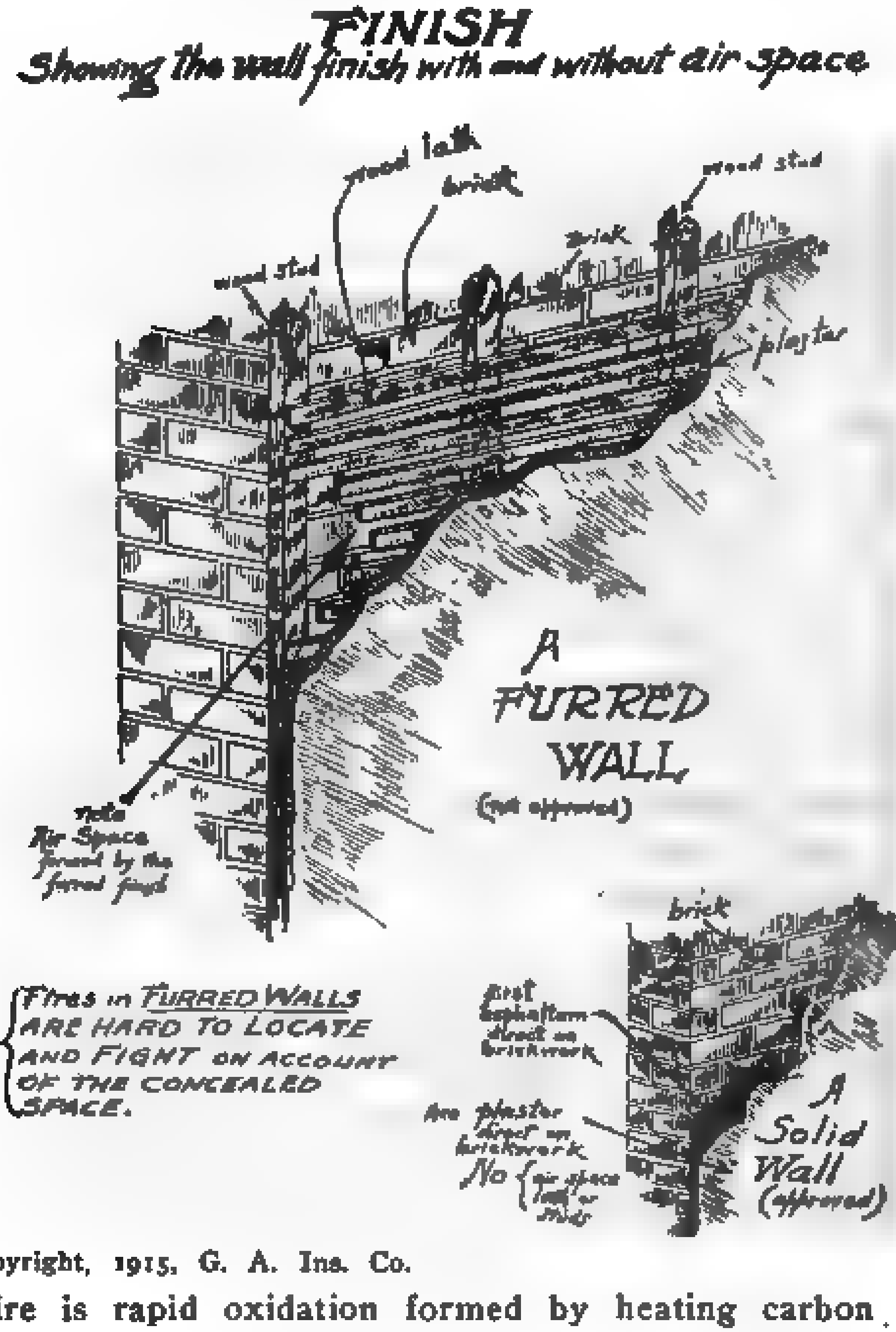
LTERING—See Liquors.

LTRATION—This is done to get rid of foreign mateof all kinds, or to extract solid matter. The old-fashd way is by filtering or straining through filter cloths, the up-to-date method is by means of bone black filter h is a large steel tank, partly filled with ground bone c (charcoal), the liquid being fed at the top and strained ugh the charcoal.

NISH (plain or hard)—A wall plastered direct without ng or a wall without any finish. See Furring; also Wood sh.

FINISHING—As the name implies, is the last process manufacturing an article.

FIRE—According to the Standard Dictionary, is heat a light emanating from a body.



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Fire is rapid oxidation formed by heating carbon s stances to a point where they combine rapidly with oxyg All ignitable substances, such as wood or paper, are carl *substances.* Consider the amount of such material ent

ıg into the construction of a frame building and realize ıat a heat force of a few hundred degrees of heat will overalance the fire equilibrium, and the wonder is that we have ot more fires. Fire needs the oxygen of the air to pronote and sustain combustion. If this is excluded, as in the ase of a sprinkler head diffusing a spray of water, or if he temperature of the burning substance be lowered below the ignition point, as in the case of applying a hose stream, the fire will be extinguished. See Water Puts Out Fire.

FIRE ALARM SYSTEMS are various in character. In crude form, consist of bell ringing, whistle blowing, hammering on locomotive tires severed in the center, or other metallic substances. The modern method is, open the door of street fire alarm box and pull down once only, the hook that is in view, letting it slide back to its original position by its own momentum. This act causes a disc in central fire station, bearing number of box pulled, to drop, and a man on duty telegraphs said number to fire companies whose duty it is to respond.

Automatic and pneumatic alarms are installed by placing series of thermostats on ceilings which operate by having he fuse within them melt by excessive heat contact, by hich action an alarm is given at a central fire station. See ombination Red Fire Alarm Box, Alarm and Manual Fire larms.

FIRE APPLIANCES (freezing of, precaution against)—nless extreme vigilance is exercised the very best installation of fire appliances may suffer temporary disablement om frost. Automatic sprinkler systems, hydrants and all pliances using water for fire extinguishment naturally reire special care and attention in winter. The following ecautions should be taken; inspections being thorough, ith nothing taken for granted.

1. Ascertain if all portions of buildings are properly heated all times to prevent freezing in any of the sprinkler ipes, particular attention being given to exposed places, ich as hallways, entries, stair towers, under sidewalks, ow windows, shipping rooms, attics, roof monitors and kylights.

2. Examine tanks and all pipes, fittings and valves, whether for steam heating, general water service, or fire protection. **See that none is frozen** or has been frozen, and **that** they are **all in operative condition,** and where there is any liability of freezing, provide the necessary protection. All metal work supporting tanks should be thoroughly cleaned from rust and painted, also tank hoops.

3. Examine carefully and provide suitable boxing around any pipe lines which may be in an exposed location (either between ground and first floor, between buildings, or near windows, doors, etc.). Make frequent tests during the winter of such sprinkler systems in order to make sure the piping is not frozen.

4. Ascertain if sprinkler dry valves are in working order, not leaking, and piping thoroughly drained; if alarm connection and gong are in order; if air pumps can be depended on for the winter.

Note.—Do not overlook low points on dry system not controlled by main drain. Blow low points out occasionally to free from condensation.

5. See that **all valves are open that should be** open, and try water outlets to ascertain if all pipes are free and ready for service.

6. See that **extra sprinklers** are on hand in case of need to replace frozen or melted heads.

7. Be sure that engineer or supervising employee is fully posted as to the purpose and intention of every valve and pipe.

8. Try pumps and see that they are in proper working order.

9. Test all of the **hydrants** and **indicator posts,** and see that they **drain properly.**

10. Examine inside standpipes and connections.

11. **Instruct the night watchman** thoroughly in the use of all fire apparatus and the operation of all valves.

12. Examine the end of suction pipe to see that leaves or other refuse matter have not clogged up the holes in the *strainer.* The capacity of the pump may be greatly reduced *by this defect.*

13. Take measures to prevent freezing of water in casks d pails in cold buildings.

14. Empty and recharge chemical extinguishers to insure eir being in perfect working order.

A thorough examination should be made of the entire eating system before putting it into service. All heating ipes should be carefully brushed down, and, where the pipig is located along walls, any rubbish or litter which may ave accumulated should be removed and pipes kept free rom dangerous contact with walls, partitions, etc.

When it becomes necessary to close a sprinkler valve durng working hours, a competent man should be stationed at the valves, so that the water can be turned on immediately n case a fire occurs.

When necessary to make changes in sprinkler system, xtra care should be taken to have the least possible portion f the equipment out of commission at one time.

Whenever it is necessary to shut water off sprinklers, or any way modify the fire protection, the inspection deirtment having jurisdiction should be first notified. (N. F. A.)

FIRE BOATS (New York City).

Name	Horsepower	Capacity, gals. per min.
Zophar Mills	550	6,000
New Yorker	750	12,000
Seth Low	240	3,500
A. S. Hewitt	450	7,000
G. B. McClellan	500	7,000
James Duane	900	9,000
Thomas Willett	900	9,000
C. W. Lawrence	500	7,000
Wm. J. Gaynor	950	7,000
D. A. Boody	240	5,000
Launch, Velox	250	5,000

FIRE CLAUSES—Those attached to **leases** usually read s follows:

Form No. 1.—*It is understood and agreed that should the*

premises be damaged so as to be totally destroyed, the lease is to be cancelled. Note.—This form is acceptable to most companies.

Form No. 2.—It is understood and agreed if the building be so damaged that the lessee or owner elects not to rebuild, then this lease shall come to an end. Note.—This form is not acceptable to most companies, as the lessee or owner can rebuild or cancel the lease as he may choose. See Leasehold Insurance.

FIRE CLAY PRODUCTS—Possess excellent fire resisting qualities. Good insurance risks.

FIRECRACKERS made by the Chinese consist of potassium nitrate or saltpetre, sulphur and charcoal. American made firecrackers contain potassium chlorate, sulphur and carbonaceous materials.

FIRE DAMAGE—If a building has been partially damaged and the damage is not entirely repaired, the insurance risk is considered undesirable.

FIRE DAMP (Marsh Gas) occurs in nature during the decay of organic matter such as decaying of seeds while in bins. Usually found in coal mines. Inflammable, but will not support combustion. When mixed with oxygen it is very explosive.

FIRE DEPARTMENT CONNECTIONS—See Siamese.

FIRE DEPARTMENT INSPECTIONS—It is very much to the advantage of firemen when fighting fire in a smoke charged building to know the interior plan and construction, where the stairways, halls, elevators, entrances and exits to all parts are located, and also the contents of the building. All firemen should familiarize themselves with every building within the district where they respond to fires on the first alarm, and every company should have in its quarters, drawings and a description of each building and its contents.

FIRE DOOR—A door built under specifications of the Underwriters Laboratories, with approved sill, frame, hangers and attachments, will resist fire one hour as shown by tests, on such doors, at the laboratory.

In approved installations, to protect an opening in a fire

wall, both doors must be automatic. An automatic door is one designed to close automatically through the release of weights due to the melting of fusible link as the result of fire heat. A self-closing door has a fusible link attachment, but is generally kept closed when not in use, or, if open, it automatically closes when released, counterweights being used.

The melting point of fusible link is usually 165 degrees F. The fire-resisting value of a wood door encased in tin depends upon the exclusion of oxygen from the wood, therefore retarding or preventing combustion, and also upon the degree to which bulging in the covering can be prevented while the door is exposed to fire. To obtain these results, the covering must be so applied that the joints between the plates will remain intact and provision should be made for the escape of the gases generated from the wood core. Fire doors are often blocked open by stock piled against them resulting in serious damage to the section intended to be cut off. See Alignum Fire Door.

FIRE DOOR MANUFACTURING, whether lock-jointed or kalamein, are no better than other wood and metal working shops. Frequent fires. See Kalamein Door Manufacturing.

FIRE DRILLS in factories. In New York State the law requires fire drills at least once every three months under the supervision of the local fire department, in every factory employing 25 or more persons. The Fire Prevention Bureau of New York City offers the following suggestions:

Definition of Fire Drills—The orderly vacating of a building by its occupants in the least possible time in case of emergency, panic or fire. This to be by nearest safe means of exit, and the use of such auxiliary fire appliances as may be provided for the extinguishment or retarding of fire.

Suggestions for Drills:

1. All employees shall be formed into squads or companies. A monitor or captain shall be designated to take charge of each squad for the purpose of conducting them from the premises; also a monitor or captain to take charge

of each squad designated to operate auxiliary fire applianc
for the purpose of retarding or extinguishing the fire.

2. On receipt of alarm of fire all employees shall assemb on their respective floors at such point and in such mann as shall be designated by the monitor or captain in charg of that floor; remove all work and portable articles fro aisles; form in double files with arms linked, and whe ordered, shall march from the floor in a rapid but orderl manner to such exit as may be designated by said monit or captain.

3. There shall be a sufficient number of employees desig nated by the owner, lessee or tenant of the premises to tak charge of the drill and to operate auxiliary appliances.

4. Guards shall be stationed at the head and foot of eac flight of stairs to preserve order and keep the line in motio or retarding same as may be necessary.

5. Squads shall be designated to search for those wh have fainted or fallen.

6. All drills shall be conducted in silence, save for th orders issued by those in authority.

7. An employee shall be designated to transmit the alar for fire to the city department from the nearest fire alar box.

FIRE ENGINE—An engine, pumping one full strea from a six-inch service main, will often reduce the pressur on the line below a serviceable point for another effectiv fire stream.

FIRE ESCAPE—See Fire Tower.

FIRE EXIT PARTITION—A partition subdividing story to restrict the spread of fire, and sufficiently stable t provide an area of refuge for the exit of the occupant thereof. See Horizontal Exit.

FIRE EXTINGUISHERS—A siphon of soda in the hom can be used as a fire extinguisher. The carbonic acid ga in the water helps to extinguish the flames. See Extinguish ers; also Fire Appliances.

FIRE FIGHTING FROM THE AIR—See Aeroplane Fir Fighting.

FIRE HEAT from wood is estimated to be from 800 t

,400 deg. F.; from coal, 2,200 deg. F.; charcoal, 2,400 deg. F.

FIRE HOSE (care of)—Aside from the general care necessary to observe when the hose is not in actual use, it must be thoroughly overhauled after a fire to detect such defects as scorching, cracking and cuts due to dragging hose over cornices or rough edges, and then it should be neatly placed on racks. See Friction Loss.

FIRE INSURANCE will only cover a small part of your loss if you have a fire. Insurance is only a partial repayment. It is indemnity against loss or damage by fire and not a guarantee against fire occurring.

FIRE INSURANCE AS COLLATERAL (Fireman's Fund Record)—The importance of fire insurance as collateral security can be understood when we are told that 97 per cent of the commerce of the world is carried on by paper exchange, and 3 per cent of it for cash.

Fire insurance is the support of commerce, the endorser, the collateral security for the protection of credit.

A cargo of Pacific Coast salmon, wheat, fruit, wine or other products, shipped to Europe, is balanced by a cargo of manufactured articles shipped from Europe to China or Japan, and the latter shipment is balanced by tea and silk shipped from China or Japan to San Francisco, Los Angeles, Portland or Seattle, the coast products being thus paid for by the tea and silk. This is credit, no cash being used, but the credit being guaranteed by fire and marine insurance policies, makes the transaction cash, as a loss of either cargo would be made good by the insurance.

Fire insurance as a collateral is the basis for credit. It enables the wholesale merchant to extend credit to the reliable trader, to the extent of five times the trader's capital, at the same prices as for cash in sixty days; for if the trader sells the goods, he will pay his bills, and if his goods are destroyed or lost, his insurance collateral will pay his debts. In either case he is practically a cash man, gets his goods at cash price, and can sell to the consumer at less than if he bought at credit prices without collateral. The reduced prices at which the trader gets his goods (the sellers taking no *risk) also pays for* his insurance over and over again.

Furthermore, as the fire insurance policy covers all stock that goes into the store during the term of the policy, $5,000 insurance on a $7,000 stock may in the course of a year have under its protection $30,000 or $40,000 worth of merchandise, thus reducing the cost of his insurance by distributing its protection over large values.

Fire insurance as collateral security also reduces interest rates and increases the purchasing power of capital.

The owner of a lot who wants to build a house can hire a greater sum of money from the bank on the property and at a lower rate of interest, when his mortgage debt is secured by insurance on the building, than he could without insurance. A warehouse receipt for wheat, fruit, wine or other produce, backed by an insurance policy, will, as collateral, command money at a much less rate, including the premium paid, than a mortgage on real estate will in the same locality.

A buyer with a capital of $20,000 invested in wheat or other produce in a warehouse can insure that produce for 95 per cent of its value; then, with the warehouse receipt, and the insurance policy as collateral, he can get $19,000 from the bank, and with this $19,000 go into the market, invest that sum in more produce, and, repeating the operation, compete in the market for $150,000 or $200,000 worth of produce on an original capital of $20,000.

The exporter who places a cargo of wheat, fruit, wine or salmon on a ship insures it under a marine policy, with which and the bill of lading he commands money immediately, at the European rate of interest, to buy another cargo; and by repeating the operation not only increases the purchasing power of his capital, but he has the advantage of cheap money to operate on. This enables the producer to get a better price than if he had to depend on the competition of local capital, and emphasizes the benefit of insurance as collateral.

Fire insurance as collateral also protects invested capital from unnecessary disturbance.

Millionaire capitalists who manage large mining, manufacturing or other enterprises in which stockholders are inter-

ested, seek the protection of fire insurance for collateral security, as it enables them to obtain cash for immediate repair of any fire damage to the property, without using funds that can be applied to better advantage by continuing uninterrupted dividends to interested people, many of whom need the money.

This idea of protecting investments by the man of millions should be applied by the man of hundreds.

The rebuilding of San Francisco following the earthquake and fire is the best evidence of the value of fire insurance as collateral security for investments and loans that the business world ever experienced. Without the $180,000,000 paid by the fire insurance companies as indorsers (under their policies) and the credit obtained for as many more millions based upon the collateral security of their policies, San Francisco, instead of now being a city of skyscrapers, would be a city of shanties and ash-heaps.

It is asserted by economists who have studied the value of insurance as collateral security that the saving in interest rates to the borrower, and on the cost of goods to the consumer, amounts to a much greater sum than the total premiums paid by the insured, and that the loss collected is all clear profit.—(The Weekly Underwriter.)

FIRE INSURANCE TECHNOLOGY is the science or systematic knowledge of the business of fire insurance including its terminology.

FIRELESS COOKERS—Report of a fire—Fire was probably caused by spontaneous combustion. This was very likely due to the sides of the receptacle sweating and dampening the sawdust, or to the disc in being dropped into the bottom, broke the solder and allowed grease or water to get through into the sawdust. Only vacuum cookers should be used or the manufacturer should do away with all solder joints in the tin and otherwise safeguard the device against fire. Mineral wool is a good packing. A case was brought to notice where a fireless cooker was found to be packed with pine shavings. Such packing is sure to cause a fire and the maker should be prevented from marketing such articles. (N. F. P. A., Vol. 4, 1911.)

FIRE LIMIT—In 1860 the fire limit in New York Ci was at 82nd Street.

FIRE LOSS (Extract from Lecture by W. N. Bament)- The fire insurance contract is based on a contingency, ar rates are made to cover the contingency, and any omissic of that which good faith demands in connection with it sufficient to warrant a court in declaring the contract voi In these days, however, no underwriter thinks of contestir a claim that is due even to pure negligence. The irrespons ble act of an insane person is no bar to recovery under fire insurance policy, neither is the intentional destruction the wife's property by the husband, or the opposite. Clair for loss due to property falling in a stove are not recove able, although loss due to curtains blowing into a gas j flame must be paid for. Both are friendly fires, the differen being that in the case of the curtain a new and hostile fi begins at the time of contact. Spontaneous combustion, u til it becomes so rapid as to produce a flame or glow, cann be classed as fire, otherwise many kinds of decompositic which is in fact combustion, would have to be paid fc Damage due to smoking lamps is likewise not recoverab else thousands of homes would have to be redecorated the expense of the companies.

Damage to steam boilers, due to lack of water in tl boiler, is not covered, although in the case of a fire beir kindled under a dry boiler by a stranger a judgment w rendered in favor of the insured. A Wisconsin case fu nishes the only departure from the harmony of opinion, ar it declared that violent and unusual heat in a furnace los its friendly nature, and judgment was awarded against t insurer.

Proximate cause is sufficient. A flywheel explosion d to a short circuit caused in a remote part of the building l fire attacking a cable of insulated wires was held a loss l fire under the Massachusetts standard policy. Damage doi by firemen under the mistaken impression that a fire exis is not covered. The preponderance of court opinion is th explosions occurring during a fire are incidents of the fi *and their damage* is covered.

The concussion of air which destroys adjacent property upon an explosion is held to be an intervening cause such as will defeat recovery. Damage from explosion due to lightning striking a powder magazine has been held to be not covered, while payment of damage to adjoining property done by the falling wall of a ruin blown over by a high wind seven days after the fire was enforced upon the company. Where a city ordinance prevents the repair of a building damaged more than a certain percentage the insurer is liable for the value of the property less any salvage. The insurer is also liable for extra expense required by city ordinance in the making of repairs to a partially burned building.

FIRE LOSSES IN UNITED STATES, 1875-1918 (from the Insurance Year Book)—

Year	Aggregate Fire Loss	Aggregate Insurance Loss
1875	$78,102,285	$39,327,400
1876	64,630,600	34,374,500
1877	68,265,800	37,398,900
1878	64,315,900	36,575,900
1879	77,703,700	44,464,700
1880	74,643,400	42,525,000
1881	81,280,900	44,641,900
1882	84,505,024	48,875,131
1883	100,149,228	54,808,664
1884	110,008,611	60,679,818
1885	102,818,796	57,430,709
1886	104,924,750	60,506,564
1887	120,283,055	69,659,508
1888	110,885,665	63,965,724
1889	123,046,833	73,679,465
1890	108,993,792	65,015,465
1891	143,764,967	90,576,918
1892	151,516,098	93,511,936
1893	167,544,370	105,994,577
1894	140,006,484	89,574,699
1895	142,110,233	84,688,030

(Continued)

1896.............	$118,737,420	$73,903,800
1897.............	116,354,575	66,722,145
1898.............	130,593,905	73,796,080
1899.............	153,597,830	92,683,715
1900.............	160,929,805	95,403,650
1901.............	165,817,810	100,798,645
1902.............	161,488,355	94,775,045
		(Estimated by publisher of The Insurance Year Book
1903.............	145,302,155	104,000,000
	(From Nat'l Board Tables)	
1904.............	229,198,050	144,000,000
1905.............	165,221,650	116,000,000
1906.............	518,611,800	292,000,000
1907.............	215,084,709	127,000,000
1908.............	217,885,850	157,000,000
1909.............	188,705,150	143,000,000
1910.............	214,003,300	175,000,000
	(Year of 1916)	
1911.............	217,004,575	190,000,000
1912.............	206,438,900	194,000,000
1913.............	203,763,550	196,000,000
1914.............	221,439,350	210,000,000
1915.............	172,063,200	167,500,000
1916.............	214,530,995	195,000,000
1917.............	250,753,640	230,000,000
1918.............	290,014,385	

Fire Loss Per Capita in United States

1915..	$1.71
1916..	2.10

FIRE LOSSES IN VARIOUS COUNTRIES

Fire Losses Per Capita Year 1911

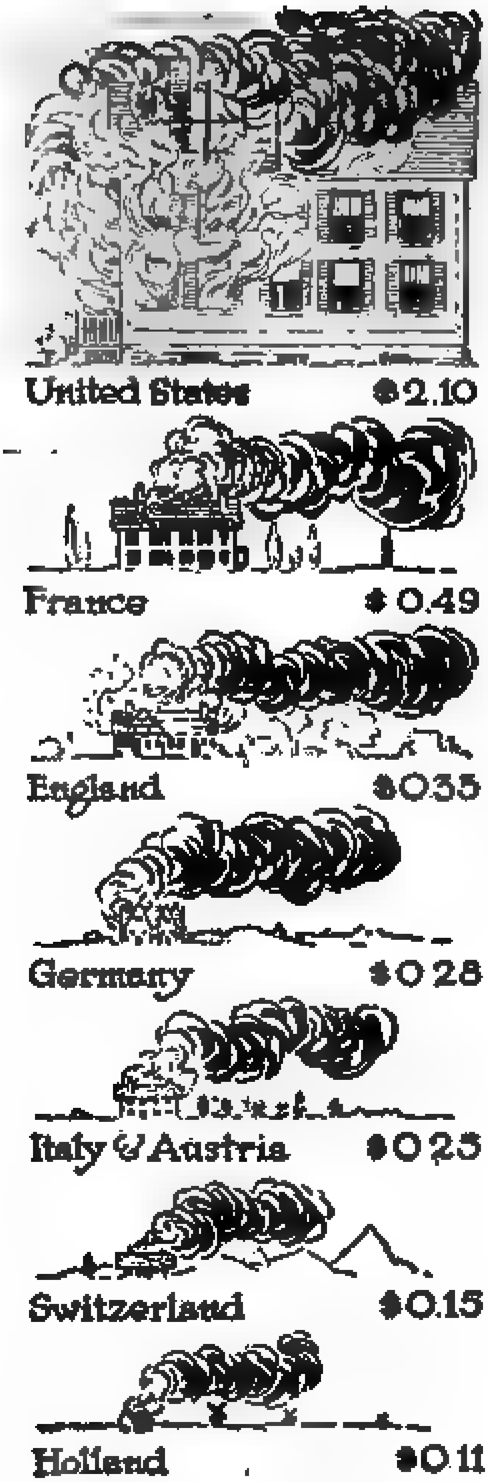
United States	$2.62
England	.53
France	.81
Germany	.21

(Continued on page 245)

Per Capita Fire Loss Figures Analyzed.
reventable (Black), Partly preventable (Shaded), and Unknown (White).

	Per Capita Fire Loss
und	$3.71
pshire	2.54
	2.57
etts	2.60
	2.62
:	2.63
	2.72
	2.76
r	3.52
	3.37
	3.18
	2.97
	2.95
.	2.42
	2.41
	2.30
	2.28
	2.26
	2.24
ota	2.23
	2.23
	2.15
	2.06
	2.02
	1.83
	1.79
	1.75
	1.70
	1.65
	1.62
ia	1.58
	1.55
ota	1.54
	1.52
	1.48
	1.48
	1.42
	1.39
	1.37
	1.35
lina	1.34
	1.32
inia	1.22
lina	1.13
olumbia	1.05
	1.04
	1.03
	.95
.	.84

The 1916 Fire Loss figures here shown are in dollars and cents. They represent more than 97% of the total fires in the United States. The figures for several states would be somewhat increased if full statistics were available. — From "Safeguarding America Against Fire," Nat. Board of Fire Underwriters.



How the Fire Losses Compare

(Year of 1916)

Ireland	.58
Italy	.31
Russia	1.17

FIRE LOSSES (per capita) 1916—Boston seems to enjoy e unfortunate distinction of topping nearly all the cities the world in annual fire losses. For 1916 its loss was .30 for every man, woman and child in the city. Taking cities of the country of about 400,000 population and ward, the per capita losses figure as follows: New York ty, $1.56; Bronx and Richmond, $1.59; Brooklyn and ıeens, $1.52; Washington, $1.06; Chicago, $2.05; Los Anles, $1.11; New Orleans, $1.13; Baltimore, $1.05; Detroit, 24; Minneapolis, $3.84; Kansas City, $2.76; St. Louis, $2.03; wark, $2.70; Buffalo, $2.27; Cincinnati, $1.51; Cleveland, 13; Philadelphia, $1.63; Seattle, $1.96; Milwaukee, $2.41, l Pittsburgh, $2.98.

)f these municipalities, it will be noted, Minneapolis is only one that exceeds Boston's startling record. Moreır, the average per capita fire loss of 329 cities in the ited States is but $2.20, which is $1.10 below that of the b City.

Jnited States Geological Survey statistics state that:

. During year 1907 fire caused the death of 1,449 persons l the injury of 5,654.

. Each year $250,000,000 of tangible values are wasted by :.

. Each minute of each day of the year sees $500 in value ing in flame and smoke, leaving an ash-pile as its monunt.

. Each year the fire loss equals $2.65 per capita of our)00,000 population.

. Each year this needless loss equals a tax of $13.00 per h family of five of our population.

. Each year shows a record of forty fires to each 10,000 our population.

Floors on Which Fires Originate—Below will be found a le based upon Fire Patrol Statistics, showing the floors n which fires in New York originated, month by month, 917.

The information is furnished by each floor, beginning with the sub-cellar and going up, and for each month of the year. The two locations noted as "C" and "B," cellar and basement, respectively, may be considered as one location. The designation "C" for cellar means the first floor below grade occupied for ordinary cellar purposes, while the letter "B," for basement, would mean the first floor below grade, but occupied for business purposes. The same is true in regard to the abbreviations "S. C." (sub-cellar), and "S. B." (sub-basement). They are set forth specifically, as the difference in the use, coupled with the origin of fires, may be of some interest.

Floors	Jan.	Feb.	Mar	Apr	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.	Total
SC		...	...	1	...		...	...	...	...	...	1	2
C	113	133	68	79	73	45	47	37	60	71	98	148	[illegible]
SB	5	3	1	...	...	...		1	1	...	1	3	15
B	91	94	80	65	53	53	55	32	52	61	78	127	[illegible]
1	245	256	198	181	179	124	134	130	131	132	178	255	[illegible]
2	149	149	148	114	126	106	116	88	91	92	112	150	[illegible]
3	86	90	95	62	79	65	81	69	72	58	82	110	[illegible]
4	69	64	62	51	45	55	58	49	43	35	52	57	[illegible]
5	30	30	35	29	35	23	31	26	20	19	28	25	[illegible]
6	19	17	11	12	16	14	7	9	11	11	9	16	[illegible]
7	6	6	3	4	3		2	3	1	2	3	5	38
8	3	3	4	1	3	1	1	3	1	3	2	...	25
9	1	4	3	...	1	2	1	2	1	2	2	4	21
10	...	3	1	2	2	2		...	3	...	1	4	18
11	1	1	...	...	...	2	2	1	1	...	...	4	12
12	2	2	1	...	1	5		...	...	...	1	...	12
13	...	...	...		...	...		...	1	...	...	...	1
14	...	1	...	...	...	1	1	...	...	...	...	...	3
15	...	...	...	...	...	1		...	1	...	...	...	2
16	1	...		...	...	1			...	1	...	...	3
17	...	...	...	...	...		...	...	...	...	...	...	
18	1	...	...	...	...	...	...	...	...	...	...	...	1
19	...	...	...	...	1	...	...	...		...	...	1	2
20		...	...	...	...					...	...	...	
21	...	...	...	...	...		...			...	...	...	
22	...	...	...		...	...	...	...	...	...	...	...	
23	...	...		...	...	...	...	...	...	...	...	...	
24	...	...		...				...	...	...	(*)	...	
25	...	...	...		...	...	...	...	...	...	...	1	1
Totals by mos.	812	856	710	601	617	500	536	448	490	478	647	911	[illegible]

* Spectator 10-3-18.

FIREMEN'S SEARCHLIGHT (acetylene torch)—A portable acetylene torch consisting of a generator and a burner (water to carbide type), using calcium phosphate as an ignition agent. Designed for use when a strong, not easily ex-

l, portable flame is desired; such as, around fires ıoky rooms. Its hazards are in a class with those ner forms of open flame kerosene torches.

LARGE, IN UNITED STATES SINCE 1897—
: Insurance Year Book.

ort News, Va..........	$2,000,000	1897
urgh, Pa.	2,000,000	1897
urgh, Pa.	2,000,000	1898
'rancisco, Cal.	2,000,000	1898
·, Col.	2,000,000	1899
lelphia, Pa.	3,000,000	1899
ken, N. J...............	5,500,000	1900
ıne, N. J................	4,500,000	1900
›nville, Fla..............	11,000,000	1901
·bury, Conn.............	3,000,000	1902
;on, N. J................	7,000,000	1902
ınati, Ohio.............	2,000,000	1903
ıore, Md...............	50,000,000	1904
:ster, N. Y.............	3,000,000	1904
Orleans, La.............	3,200,000	1905
'rancisco, Cal...........	350,000,000	1906
York, N. Y.............	2,500,000	1908
:a, Mass................	12,000,000	1908
olm, Minn., Etc........	5,000,000	1908
ce, Idaho, Etc..........	4,500,000	1910
Spur, Mont., Etc.......	6,000,000	1910
:sota	3,500,000	1910
y, N. Y................	5,500,000	1911
›r, Me..................	3,500,000	1911
' Island (Dreamland)...	2,500,000	1911
York	3,000,000	1912
:on, Texas	4,500,000	1912
lton, Ohio	2,000,000	1913
Springs, Ark...........	2,250,000	1913
, Mass..................	14,000,000	1914
ort, Va.................	2,000,000	1915
go, Ill..................	2,000,000	1915
:lyn, N. Y.............	2,000,000	1916

Fall River, Mass	$2,000,000	1916
Paris, Texas	5,000,000	1916
Augusta, Ga	5,000,000	1916
Canton, Md	2,000,000	1916
Marshfield, Ore	2,100,000	1916
Black Tom Is., Jersey City	11,000,000	1916
Swissvale, Pa	4,000,000	1917
Pittsburgh, Pa	2,000,000	1917
Kingsland, N. J	12,000,000	1917
Atlanta, Ga	5,000,000	1917
Drumwright, Okla	2,000,000	1917
Brooklyn, N. Y	2,000,000	1917
Baltimore, Md	3,500,000	1917
Pittsburgh, Pa	2,000,000	1917
Jersey City, N. J	2,000,000	1918
Kansas City, Mo	3,000,000	1918
North St. Louis, Mo	2,500,000	1918
Noxen, Pa	2,250,000	1918

Largest conflagrations during 1918:

Indianapolis	$1,000,000
Johnstown, Pa	1,000,000
Jersey City	2,000,000
Kansas City, Mo	2,500,000
North St. Louis	2,225,000
Pembroke, Ont	1,000,000
Canton, Ohio	1,000,000
Joplin, Mo	1,500,000

FIRES AT SEA—One of the most promising of the new methods of fighting fire on shipboard at sea is to fight the fire with fire. By this system the hot gases that come from the boiler flues and ordinarily go up the smokestack are used to smother a fire.

A vessel is equipped with large pipes running from the boiler room to all parts of the ship, and at any time the flue gases can be switched from the smokestack to these pipes. The pipes would pour these flue gases into the hold or the *sections of the ship* where the fire was raging and smother it

Flue Gas contains only 9 per cent of oxygen, and 15 per cent of oxygen is required to support fire. Consequently if great quantities of flue gas are poured into the burning hold, the oxygen there will soon be reduced to a point where combustion cannot continue and the fire must die out. Automatic sprinkler protection is the best known method of extinguishing fires and is particularly applicable to ships. As there are numerous small compartments on all ships where a fire can smoulder a long time before discovery, a sprinkler in one of these rooms would insure rapid extinguishment.

Most of the disastrous fires in holds of ships are caused by the chemical combination of a miscellaneous cargo. Coal and oil are known to be dangerous. Fibres packed in bulk and under pressure are perilous. Jute is dangerous and also all kinds of oiled fabrics. Combinations of substances which of themselves are harmless but which in combination set up a dangerous chemical reaction producing fire should be guarded against as much as possible. The time will probably come when we will have expert cargo packers who will know what not to place in ships where leakage or breakage is apt to cause fire.

FIRE IN PERSON'S CLOTHING—Throw the person down and, commencing at the head, wrap a rug, mat or any woolen cover around him and roll him on floor. A woman attempting to extinguish such a fire should be careful that her own clothing does not become ignited, and should hold the covering in front of her, and beginning at the person's head, throw the covering toward his feet. If alone, lie on floor and roll to nearest rug and wrap yourself in it. Do not run to an open window, door or to the street, as this will fan the flames.

FIRES IN FRANCE—See Responsibility for Fires.

FIRES IN OIL TANKS—See Oil Tank Fires.

FIRE PAILS are the simplest, handiest and best extinguishers for incipient fires. One standard fire pail is required for each 500 square feet of floor area. Pails should be galvanized, painted red with word "Fire" in black letters 4" high, and be of 10 or 12 quarts' capacity. So that they may be easily *accessible, pails are to* be placed not less than two

feet from the floor to the bottom of pail, nor more than five feet from floor to top of pail. In fire insurance ratings, one fire extinguisher is considered equal to six pails; but one-half of the equipment must consist of pails. Fire bucket tanks holding six pails are approved and are more desirable than the individual pails. One-half the required number of pails in grease or oil risks should be filled with sand. On piers, or roofs of sheds or buildings, oak casks or tanks of 50 gallons' capacity, each having three fire pails, casks staggered 50 feet apart, are accepted. Hasty filling of fire pails while the inspector is waiting in the office for the manager may be detected by finding spilled water on floor under them, swinging pails, or water in agitation. This trick is often resorted to. See illustration on page 699.

Over a considerable number of years it was discovered in London that about 30 per cent of the fires were extinguished by means of firepails. Twenty-two and one-half per cent by weight of calcium chloride added to a pail of water improves the extinguishing properties and reduces freezing point below 32 deg F. See Pails and Casks; also see Staggered.

FIREPLACES—Open fireplaces should be provided with screens to prevent children's clothing coming in contact with the fire, and to keep sparks from flying into the rooms. Most fires are caused by radiating heat to combustible floors or mantels. A safe fireplace will have a fireproof hearth of enough area and thickness to prevent radiated heat igniting the floor. The mantel should be of incombustible material. Ornamental hearths have been responsible for many fires. They are mostly made of flat tiling or cement laid on the floor boards in a thin layer. Tenants, unaware of the danger, frequently build fires on them with disastrous results.

FIRE POINT—Temperature at which oil ... nently ignited. Usually several degrees ab...

FIRE PREVENTION OBSERVA... Kenlon of New York on the needs of ... of the great needs are:

"1. **Fire Walls in Factor**... factory building wi... *capacity to a floo*...

and a wall would shut it out, let the wall in part—say 40 per cent of it—be built of polished wired glass. This material would withstand an intense heat for thirty minutes or more. Doors through the fire wall, built of thoroughly fireproof material, would allow the persons on one side to flee for safety past the fire wall if fire should break out in their portion of the room.

"2. **Fire Escapes in Enclosed Towers.** There is absolutely no doubt that the present form of fire escape is doomed to go as inadequate. The inclosed staircase in a fireproof tower, built outside the building, is the one sensible solution of the problem. Entrance is had in this type of fire escape only through doors reached by balconies and not directly from the building where a fire may be raging. Thus the fire tower is not only fireproof, but is smoke-proof as well.

"3. **Automatic Sprinklers in All Department Stores, Storage Warehouses and Manufacturing Lofts.** The sprinkler has already proved its efficiency, and its installation should be made compulsory.

"4. **A Sane Alteration of the Law Regarding Exits.** At present staircases are required to be the same width whether the building be four or forty stories high. Owners should be compelled to widen the staircase in large buildings toward the bottom, following a carefully graduated scale, so that the people rushing down from above would not jam into people from below above the maximum capacity of the staircase. With the adjustment of staircases to the fire needs should come the 'certificate of occupancy,' under which an owner would be prevented from changing the character of his building after having been inspected and approved—so that an inspection for mere storage purposes should not cover the putting [illegible] of girls to work in factories on upper floors.

"5. [illegible] ment of the Regulations Requiring [illegible] A good janitor and an efficient en[illegible] g are the firemen's best friends. I [illegible] nerator in the basement of every [illegible] bbish could be thrown as soon as [illegible] would insure its destruction. In

the absence of the incinerator, the next best substitute is a receptacle for rubbish of fireproof material which would prevent its accumulation in a condition to serve as fire food.

"6. **The Abolition of Heavy Fireproof Roofs.** The fireproof roof of slate and metal is itself a menace, as it is especially liable to crash through the building, carrying floor after floor with it to the ground. The heavy roof of the Equitable Building is what did the damage and smashed in the floors that killed Fire Chief Walsh. Before that fire I would not have thought to include the making of lighter roofs as a great necessity."

FIREPROOF—The term used to express a building built of fire-resisting material, such as steel or concrete, which of themselves are not combustible and will withstand the ravages of an ordinary fire without rupture or impairment for at least four hours. The term "fireproof" is a popular expression used to denote "fire-resistive." See Unprotected Iron.

FIREPROOF APARTMENT HOUSE (Alwyn Court Building)—Fire, March 4, 1910. Ordinary glass windows allowed the fire to leap from floor to floor on the outside of building. Wired glass windows in standard hollow metal sash and frame would have prevented this.

FIREPROOF BUILDINGS—"A so-called fireproof building bears about the same relation to its contents that a furnace or stove does to the material put into it to burn. As a rule the fireproof building will prevent the spread of fire to other buildings just as a fire will not spread from one stove to another placed near it; but the contents of a fireproof building will be consumed once the fire is well under way just as thoroughly as the coal and wood in the stove. Further, the heat will be retained in the fireproof building and human beings, if they fail to get out quickly, will be killed. This is particularly true of a building filled with merchandise, and to a very much less extent to an office building. If there is only the ordinary office furniture in an office building, the danger to life is not great; but if there is a large amount of inflammable material, such as

partitions, office records, etc., stored in some dark floor, you would not want to be in the upper part of some tall structure where the stairs and elevators are in open shafts and carry the heat chimney-like to the upper floors."

A building constructed entirely of fire and heat-resistive material is fireproof as long as it contains no inflammables. The contents of such a building are more liable to destruction than the same material in a frame building. Underwriters frequently overestimate the amount of salvage to be derived from a stock on the floor of a fireproof building and frequently have an "over-line" when fire comes. In New York City in 1910 there were 2,929 fireproof buildings, of which there were the following: 265 in course of construction, 309 office occupancy, 342 light manufacturing, 331 heavy manufacturing, including printing; 268 apartments, 167 hotels, 134 private dwellings. Fireproof buildings in U. S. and Canada in 1910 were approximately 16,000, of which one-half were in New York City, Chicago, Philadelphia, Boston, Pittsburgh, and St. Louis. (Weekly Underwriter.) See Demolition of Fireproof Building.

FIREPROOF CONSTRUCTION, according to insurance requirements. A building shall be deemed fireproof construction if it conforms to the following requirements: All the walls constructed of brick, stone, concrete or terra cotta; all floors and roofs of brick, terra cotta or reinforced concrete placed between steel or reinforced concrete beams and girders; all the steel entering into the structural parts encased in at least two inches of fireproof material, excepting the wall columns, which must be encased in at least eight inches of masonry on the outside and four inches on the inside; all stairs, elevators, public hallways, corridors or other shafts enclosed in fireproof partitions or enclosures; all doors of fireproof design and labelled; all stairways, landings, hallways and other surfaces of incombustible material; no woodwork or other combustible material used in any partition, furring, ceiling or floor (the latter may be wood if laid on sleepers without air space) and all doors and sash trim and other interior finish of incombustible material; all

windows (side walls and in courts), shall be wired glass in labelled sash and frame. In factories the floors should be inclined and cement covered with scuppers to carry off water. See Wood Finish and Trim.

FIREPROOF ROOFS—See Fire Prevention.

FIREPROOFING CLOTHING—Dissolve 25 cents worth of ammonium phosphate in one gallon of cold water for five minutes. If an ounce or two of alum is added to the last water in which the clothing is washed, it will be less inflammable. This method is used particularly for fireproofing children's clothing. See Fire in Person's Clothing.

FIREPROOFING COTTON GOODS—Use sodium stannate and ammonia sulphate.

FIREPROOFING OR STAINING WOOD—Lumber is piled on iron cars and run into large steam cylinders, and by means of a vacuum the air is drawn out of the lumber. It is then put into a solution of ammonia and salts for fireproofing, except for cheap work when alum is used. For staining, salts and bark extracts are used. After lumber is entirely saturated, it is taken out and placed again on trucks and run into brick and frame hot air kilns with a temperature of 125 deg. F.

FIREPROOF WOOD—Is wood treated by saturating with a solution of salt, etc. On an extensive fire test it was noted that fireproof wood ignited at a temperature not exceeding 100 deg. more than untreated wood. In comparison with untreated wood it smokes at about the same temperature, can be ignited at about the same temperature, will continue to burn in many cases, is a good fuel and makes a hot fire.

Fireproofing Balsam Wood—The wood is thoroughly dried in kilns at about 175 deg. F., then placed in steam-heated cylinder where a vacuum is created. Sulphate of ammonia or phosphate of ammonia is then forced into the cylinder at about 100 pounds pressure. Under this pressure the chemicals are forced into the wood. It is again dried at about 125 deg. F. See Burnettizing.

FIRE PUMPS—National standard sizes:

Steam Pumps

Diameter of Steam Cylinder.	Diameter of Water Plungers.	Length of Stroke.	Gals. per Minute.	No. of 1⅛" Fire Streams.	Suction.	Discharge.
14 in.	7½	12	500	2	8	6
16 in.	9	12	750	3	10	8
18 in.	10	12	1000	4	12	8
20 in.	12	16	1500	6	14	10

Centrifugal Pumps

Capacity and speed. The four standard sizes for centrifugal pumps will be as follows:

Size of Pump

Gals. per Min.	No. 1⅛" Streams
500	2
750	3
1000	4
1500	6

	Size of Pump (gals. per minute) 500	750	1000	1500
Suction Inlet	6 in.	8 in.	8 in.	10 in.
Discharge Outlet	6 in.	8 in.	8 in.	10 in.

A centrifugal pump is usually named 4-inch, 5-inch, 6-inch or 7-inch, according to the size of its discharge outlet. This outlet, also the inlet, should be enlarged to the Standard Underwriter outlet, either in the casing pattern or by reducing casting bolted to the pump casing, so as to bring the openings up to the sizes given in the table above.

Rotary Pumps—Standard Sizes for Rotary Fire Pumps

Nominal Gals. per Min.	Approximate Width of Buckets.	Approximate Distance Between Centers.	Approximate Speed Rev. per Min.	No. of 1⅛" Streams.	Approx. H. P. Required for 100 lbs. Pressure.
500	8 in.	7 in. or 8 in.	275	2	60
750	9 in. or 10 in.	8 in. or 9 in.	275	3	90
1000	10 in.	9 in. or 10 in.	250	4	120
1500	12 in.	10 in. or 12 in.	250	6	180

Suction and Discharge Openings

The openings in pump casing for suction and discharge must not be *less than as given* below:

Size of Pump	500 gal.	750 gal.	1000 gal.	1500 gal.
Suction Inlet	6 in.	8 in.	8 in.	10 in.
Discharge Outlet	6 in.	8 in.	8 in.	10 in.

FIRE PUMPS should be in separate fireproof buildings or a section so isolated that a serious fire will not put the pump or source of power out of commission. Fire pumps, for standpipes, using electric power, should have their source of current supply so protected that fire, in building they are designed to protect, will not put them out of commission. Likewise, discharge pipes should be buried underground with post indicator valves to control the risers in the various sections. Lessons learned at Brooklyn Eastern District Terminal fire, November 25, 1912. See City Mains and Reservoirs. See diagram on page 637 for location of suction, discharge or other parts.

FIRE RECORD—A careful underwriter will not only look up the financial standing of the applicant, but will refer to the fire record book which contains the names of those who have had one or more fires of sufficient importance to indicate that they should be under scrutiny. Such records are furnished by bureaus which collect this data and furnish it to company subscribers.

FIRE-RESISTIVE—See Fireproof.

FIRE-RESISTIVE CONSTRUCTION is a better name than fireproof construction. It means that buildings and all of the parts of buildings are designed and arranged to retard the action of fire. There is really no such thing as a fireproof building.

FIRE-RESISTIVE SOLUTIONS—Asbestos paint possesses the valuable property of retarding the action of fire. A coating of sodium tungstate also retards the action of fire.

FIRE RETARDANT—A substance or device capable of retarding but not necessarily preventing the progress of fire.

FIRE RISK of a substance depends upon two properties: 1st, upon the amount of inflammable vapor that it will liberate or furnish in a given time; 2nd, upon the temperature at *which this vapor* will ignite. Dangerous substances possess

both these properties; the absence of one vastly increases the safety.

FIRE RISKS—See Bad Fire Risks.

FIRE RUINS—It is not considered good judgment to write lines on a risk which has suffered a fire where the damage has not been repaired or in process of repair.

FIRE SHUTTERS of the metal clad type are built in the same manner as metal covered fire doors. Iron shutters have "flat bar" or "angle iron" frames.

FIRE-STOPS—An incombustible partition of fire-resistive property between sections, cornices, frame walls, etc. (Not a complete cut-off nor a fire wall.) May describe intermediate walls or buildings between risk and exposing risks. Furred walls or partitions may be firestopped while the building is being constructed, if the workmen place broken brick, loose mortar and other incombustible material (which is usually carted away) at the floor levels of all stories where the furred walls communicate to other floors. See Furring.

FIRE STREAM—Standard fire stream; by this is meant he delivery of not less than 250 gallons of water per minute rough a $1\frac{1}{8}$-inch, smooth-bore nozzle. To secure this volne it requires a pressure of not less than 45 pounds to the uare inch at the base of the nozzle, which will give aproximately a reach of 63 feet horizontally and about 70 feet rtically. (John R. Freeman.)

Fire Streams—The quality of fire streams depends directly on the pressure at the nozzle and the form of nozzle used. By good fire streams are meant streams which carry the lculated distance, retaining to a reasonable extent their lidity and without excessive spray. Costly experience has lown that in serious fires a small stream is evaporated as falls in spray through the flames, while if a large stream is rown, enough may escape the evaporation to pass through e heated gases and reach the burning coals themselves. hn R. Freeman, C. E., after exhaustive tests on streams om nozzles, set forth the following specifications for a good e stream, which up to the present have been considered as tlining fairly the requisites of such a stream:

(a) A stream, which at limit named, has not lost cont nuity of stream by breaking into showers of spray.

(b) A stream, which up to the limit named, appears ı shoot nine-tenths of whole volume of water inside of a circ 15 inches in diameter, and three-fourths of it inside of a te: inch circle.

(c) Which is stiff enough to attain in fair condition tl height or distance named, even though a fresh breeze we: blowing.

(d) Which at limit named will, with no wind, enter a roo through a window opening and barely strike ceiling wi force enough to spatter well.

From the above, it may be assumed that with a certa named limit the stream would be good, while at another may be poor. This is just the case. For instance, a strea which holds its shape for a distance of fifty feet may be cor pletely broken up at seventy-five feet. (Fred Sheppard Fire and Water Engineering.)

FIRE TOWER—A brick or other masonry tower or sha enclosing a stairway of fireproof material. The walls mu extend from ground to at least three feet above the ro(No openings are permitted except fireproof windows over court or street. The entrance is indirect, i. e., a "lead" su as a balcony outside of main building connects to an open vestibule entering the stairway enclosure. Stairs must op on a street or a passage to street. Affords a sure exit fr(building and a vantage point for firemen, as no flame smoke can enter the tower directly.

FIRE TRAPS—A name peculiarly descriptive of a poo constructed building with inadequate exit facilities, unp tected floor openings, hazardous occupancy, and containi much combustible material. In this type of structure, v(little attention is given to housekeeping, internal fire p tection or care of premises.

FIRE TUBE BOILER—One in which the heat, sm(and gases of combustion pass through one or more tu surrounded by the water in the boiler. Also called "tubul boiler.

FIRE WALL—In strict sense should be a masonry w

of sufficient thickness, height and width to withstand the element of fires, confining them to a prescribed (theoretical) area. Not less than 12 inches thick, without openings, extending above roof at least three feet and projecting from side walls of protected buildings. A wall subdividing a building to restrict the spread of fire. It shall have such thickness as to prevent the communication of fire by heat conduction. It shall have such stability as to remain intact after the complete combustion of the contents of the building on one side of the wall; and its structural integrity shall be unaffected by any wreckage of the building resulting from such fire, or its extinguishment. In fire-resistive buildings with full protection floors and roof, a fire wall need not be continuous through all stories, nor need it extend through the roof. In all other buildings it shall start at the foundation, be continuous through all stories, and extend three feet above the roof.

Value of a Fire Wall—The fire at Borden, Van Alst and Third Streets, Long Island City, on June 8, 1913, clearly shows the value of a standard fire wall. At the time the seven-story fireproof sprinklered risk (known as the Blanchard Building) was under construction, the owners were confronted with the very serious problem existing in the adjoining exposure known as the Pratt & Lambert Varnish Works, composed of one- and two-story brick buildings occupied for boiling, thinning and storage purposes.

The problem was finally solved by the erection of a blank 16-inch and 12-inch common brick fire wall, extending to a height equal to that of the fourth-story windows of the Blanchard risk.

On the morning of June 8 fire completely destroyed the building occupied by the Columbia Paper Box Company, situated across the street from the Blanchard risk. The flames then leaped around the easterly side of the Blanchard risk, almost completely wiping out the varnish works, but owing to the fire wall it was effectively prevented from approaching the Blanchard risk. See Fire Prevention Observations.

Fire Wall, An Outside—A solid, blank masonry wall at least 12 inches thick. It is either part of a building or a

separate wall built to protect a building from an exposure. In the case of frame buildings, the wall should extend five feet beyond building cross walls. The fire record shows that many serious losses have been averted by the use of specially built fire walls.

FIRE WINDOW—A window (wired glass) installed as per Underwriters' requirements, and constructed of materials which have been tested and approved by the Underwriters' Laboratories. The sash, frame, glazing and automatic closing device are included in test.

FIREWORKS depend upon nitrates to support combustion and not upon chlorates. See Explosives.

FIREWORKS (special) contain red phosphorus, a fulminate, and are explosive.

FIRE ZONES—Localized fire zones are found in nearly every large city. They are localities which seem to attract a certain class of tenants bent on incendiarism. There is apparently a set of people who move from one city or section of a city to another with the avowed purpose of incendiarism. They change their names but not their habits. The class is not confined to any one race or nationality and too much care cannot be exercised in scrutinizing the records of antecedents of applicants whose term of residence in any particular section or city is very short.

FISH GLUE—Made from the skins, scales and tissues of fish by boiling, then allowing to settle, and finally straining through cloths.

FISH OIL—Flashes at about 550 deg. F. Subject to spontaneous combustion when rancid. See Hardening and Tempering.

FISH PLATES—Splices of inch-board, three feet in length, nailed like splints for a broken limb, on both sides of a splice.

FISH SCRAP—Largely used as a fertilizer. Piles of same should be protected from rain and other moisture owing to the liability of spontaneous combustion.

FISH STORES—In frying fish lots of grease is used and ranges become very greasy. The entire top should be enclosed in metal hood, ventilated to proper flue.

[F]ISHING TACKLE—Manufacturing hazards are metal-
king and woodworking. Use celluloid cement and amyl
ate when binding rods.
[F]IVE AND TEN CENT STORES—Stock consists of a
it variety of toys, knick-knacks, hardware, novelties, in-
ing celluloid articles, sheet music, groceries, paints. In
e places peanut roasters and candy making machinery
be installed. Demonstrating patented articles introduces
additional hazard if heat is used. Considerable packing
erial is used. Fire record of class is not good. See Va-
y Stores.
[F]IVE PER CENT WAIVER CLAUSE—Forms a part of
co-insurance clause. In case of claim for loss on the
perty described herein not exceeding five per cent (5%)
he maximum amount named in the policies written there-
and in force at the time such loss shall happen, no special
ntory or appraisement of the undamaged property shall
required.
[F]IXED AIR is carbonic acid gas.
[F]IXED OILS are of animal or vegetable origin and un-
certain conditions may be subject to spontaneous com-
ion. They cannot be distilled at ordinary atmospheric
sure.
[F]LAMES (Candle Structure)—The flame of a candle is
rious thing, for it teaches one of the best lessons pos-
to the student of fire protection. Every lighted can-
s a gas factory. If you will look carefully at the flame
n the air is still, you will see that it is hollow, like a
, and the space inside of this shell is filled with dark
not yet afire. There are three principal regions to a
le flame, the interior region is dark and consists of coal
the next region is where oxygen is being united with
gas (the luminous part), while the last is the oxydizing
on, the hottest part of the flames. The flames seen in
ing buildings have the same structure. See Water Puts
Fire, How. See Conflagration Blast.
[F]LAMING ARC LAMP is made by introducing vola-
chemicals into the flame. These chemicals are placed
hole drilled in the center of the carbon. They vaporize

from the heat of the carbon. It is rapidly replacing the ordinary arc lamp.

FLANGE—A projecting ledge or rim.

FLANNELETTE is generally used for nightgowns on account of its long loose nap. If it becomes ignited while worn, it is almost certain that the wearer's life is doomed as it flashes up immediately. It should be treated with a lasting chemical fireproofing process. See Fireproofing Clothing.

FLAP-CHECK VALVE—A valve with a flap hinged at the upper side, allowing the passage of liquids in one direction only. See Ball-cock Valve.

FLASH POINT—The temperature at which a vapor over a liquid is sufficiently dense to produce a momentary flash of fire. The lower the flash point, the more dangerous it becomes. See Burning Point.

FLASHER—A device for opening and closing circuits to the lights for intermittent electric signs.

FLASHING—Broad sheet of metal with one edge inserted into the joints of brickwork or woodwork, and projecting out several inches and fastened down close to the roof to prevent leaks.

FLASH-LIGHT POWDERS—Aluminum and magnesium powders mixed with chlorate of potash and other carriers of oxygen for intensification ignite readily and are highly explosive; should be kept in cool, dry places.

FLASKS (Foundry)—Frames are of wood or iron, four sided, without top or bottom. Used to hold the sand moulds in position. Wooden ones frequently become charred from molten metal and losses occur from storing these flasks inside of buildings or against wood partitions where hidden sparks break out into fire.

FLASKS USED IN FOUNDRIES—Boxes which contain the mould into which melted metal is poured for casting.

FLAT ARCH—In floor construction, an arch with flat upper and lower surfaces. Generally not as strong as segmental arches. See Floor Arches.

FLAT RATES—A name given rates which have no al-

lowance in their make-up for co-insurance. Some States demand that these rates be published.

FLAT ROOF—A roof which has a pitch not exceeding 20 degrees.

FLAT STOCK—Stock that is piled flat, such as cardboard, paper, etc.

FLAVORING EXTRACT MANUFACTURING—Use steam and gas percolators, mills, mixers, alcohol, fruit juices and essential oils. Care of packing material, method of heating kettles and grinding are main hazards. Not considered a desirable class.

FLAX—A fibre classed as soft. See Fibres.

FLAX STRAW—Formerly a waste by-product of the flax industry in the Southwest. It is now utilized in paper making.

FLESHING—Consists of removing, by machinery or hand, the fatty tissues clinging to the flesh side of skins or hides.

FLOATERS—A policy that covers goods wherever located without specifying any designated locations, except that it excludes goods in the main plant or factory. Not all companies care for floating insurance.

FLOATING DRY DOCKS—Are of various types. The all-steel construction is the best. They vary in size, being upwards of 500 feet. They are built of heavy steel plates about one inch thick, riveted together with channel or angle irons and plates. The pontoons (compartments) are usually separated by steel walls. High pressure boilers furnish steam for power to engines, dynamos, air compressors and pumps. As the walls and floors are of steel, the boiler hazard is not severe. The mechanism for pumps are electrically operated on separate circuits for each pontoon. High amperage and voltage is required and electric installation should be of the highest standard. The "box type," i. e., a dry dock of one section, rather short and squatty in appearance, is made of wood (heavy construction). The floor is usually 4 or 6 inches thick, the sides 2 or 3 inch plank on 4 x 6 inch timbers, caulked water tight.

The "sectional" dry dock is one made up of several sections, built separately but operated as one. Sections can

be added or taken out according to the size of boat to t accommodated. These are also of heavy wood constructio

On the "box" or "sectional" type, steam power is us(to operate the pumps. The steam is furnished either t boilers built on the dry dock or by steam line from shor The boiler hazard is severe, i. e., like building a high pre sure boiler on the second floor of a frame building. U right, iron, asbestos-clad boilers are used, resting on a co crete base on wood, in a small compartment wherein are al located the engine and pumps.

To lower the dock dry, water is pumped in sufficiently fill the compartments; to raise the dock the water is forc out.

Dry docks are used for repairing ships. Aside from fir originating on the ship itself, the chief hazards are boile soft coal fuel, high pressure steam pipes in contact wi wood, electrical apparatus and wiring, open forges for he ing rivets, compressed air riveters, oxygen-acetylene weldi oily waste in engine room, oily floor, storage of lubricati oil, rubbish and painting hulls.

Floating dry docks are moored in shipyards and basi alongside of bulkheads with narrow stringpieces or gar ways between. Fires starting in any of the numerous she near the dry docks are imminent. It is well to rememt that when a dry dock is lowered it is under water, when actual use it is above water and the compartments are emp of water.

FLOATING FOUNDATION—Is an entire flat bed concrete reinforced with steel. Used only when a solid fou dation cannot be reached.

FLOATING OIL—See Canals and Feeders.

FLOCK—The refuse fibre from rag-grinding machir The Flock which is used for covering wall paper is cc posed of ground felt. The dust made in grinding flock heavier than air and is said to be non-explosive. Flock c thrown into the air spreads rapidly and settles quickly. Flowers and Feathers.

FLOOR ARCHES (Berger Arch)—Similar to Truss *Arch.*

Columbian System consists of a combination of rolled steel bars and concrete. The bars are of cross-shaped section and are hung to the floor beams by steel stirrups cut to the exact shape of the bar used. The bars and stirrups are then surrounded by cement concrete. Two forms of this system are in use, the "panelled," in which there is only one plate (the floor), and the "flat ceiling," in which plates are employed for floor and ceiling. Beams are protected by a concrete slab, made at the building and held on the beam flange by malleable iron clips moulded in the blocks and held in place by longitudinal wires. These blocks are placed on the beams first and concrete filled in to make the plate and haunches at the same time. The concrete used is generally 1 part cement, 2½ parts sand, and 5 parts broken stone.

Columbian Beam Plate is made of concrete moulded generally at the building. There are two ties running through the block lengthwise and two malleable iron clips set right in the block. Then, when block is laid, the concrete is run right in on the top. It is a straight concrete arch. Columbian Iron Bars are made either single, cross or double-cross in section and about 5 inches deep. These run from beam to beam, and are hung in stirrups. The malleable iron clips are protected by the concrete. There is a ¾-inch air space below the beam between the concrete protection. The ceiling consists of a concrete floor plate as in the previous form with the addition of lighter bars, resting on the lower flanges of the beams on which bars the concrete ceiling slab is cast. An air space is left between the two plates (floor and ceiling), but the exposed webs are either left exposed or are encased in concrete.

Combination Arch—A combination of terra-cotta tile and reinforced concrete. Courses of terra-cotta tile are laid on a wood centering with a four-inch space between each course of tile. Steel rods are placed in the intervening spaces and the spaces are then filled in with concrete to the top of the tile.

Excelsior Arch—A combination end and side construction *arch of terra-cotta, using* side construction skews.

Expanded Metal Company's System Flange Type, when used for wide spans (from 8 feet to 15 feet), has arched channels about 4 feet apart, sprung from girder to girder to reinforce and stiffen the floor plate. Concrete ribs are then built up on these channels to the level of the tops of the girders, and sheets of expanded metal are laid flat on the tops of the beams and the concrete ribs to receive the concrete floor plate.

Another form designed to give a level ceiling for plastering is constructed by laying sheets of expanded metal on the lower flanges of the I-beams. A 3-inch concrete plate is then placed and tamped and a lighter cinder concrete is filled up to the tops of the beams.

The concrete used is generally made of 1 part cement, 2 parts sand and 5 to 6 parts furnace cinders, the mixture varying somewhat with the character of the sand and cinders.

Fawcett System consists of hard-burned terra-cotta lintels running from beam to beam and filled on top with a cinder concrete. For convenience in setting, the ends of these lintels are cut diagonally and they are laid at such an angle to the beams that the shorter diagonal is at right angles to them. These lintels bear on and fit around the lower flanges of the beams so as to leave an air space of about ¼-inch under their entire length. This space connects with the interior of each lintel, and theoretically there is a connected air space under all beams and through all lintels. Air flues or thimbles may be built into the exterior walls, thus connecting these spaces with the outside air.

In erection, the lintels are set without mortar. No reliance is placed on them for ultimate strength as they are employed only as centers to receive the load-bearing concrete. For the supporting metalwork, small I-beams are used, usually 4 inches to 7 inches, spaced from 2 feet to 2 feet 6 inches on centers.

Guastavino System consists of arches of hard-burned tiles laid in three courses and is used more generally in public or semi-public buildings. These tiles are 1 inch by 6 inches by 12 inches, and are laid in neat Portland cement, breaking *joints.*

ıe arches are designed especially for each building and be either dome or barrel-shaped. The dome arches have used for rooms as large as 70 feet square and may be with a decorative tile requiring no finish. The essential of this system is, that the best cement must be used. concrete is simply a filling. There are no steel sup-ıg members in the arch.

Guastavino Tile Arch.

ıverstraw Arch—A hollow brick, segmental arch used ıeavy loads. Two courses may be used, or one course ed with cinder concrete on which the sleepers and ing is laid.

ennebique System—The armature of the beams is formed teel bars placed at the lower flanges, and by vertically ed stirrups which embrace the bent steel tension bars. columns have the steel rods near the corners and tied ther at close intervals with hoop steel ties or collars.

erculean System reinforced floor arch is composed of

terra-cotta blocks held in place between each row of tile with "T" irons.

Johnson-Long-Span—A terra-cotta tile floor arch, reinforced. The tile is laid on a one-inch layer of cement mortar through which run large steel wires transversely interwoven with steel wires or rods. The steel reinforcement extends from column to column.

Kahn System—Made by Trussed Concrete Steel Co. The cross-section shows two horizontal flanges or wings, projecting at opposite sides. These flanges are sheared up at intervals to form rigidly connected diagonals, making a unit of main bar and shear members. Uses a truss bar and resembles a straight bar with iron bars sticking upward at about 45 degrees.

Lee Hollow-Tile and Cable-Rod Floor System—Combines terra-cotta blocks with suspension cables for use in long spans in place of other reinforcement.

Mackolite Floor System consists of moulded blocks made of plaster of paris, mixed with water and chemicals. The mixture is moulded in forms, left a short time to set, and kiln-dried for about four days. These blocks are made up to a maximum length of 5 ft. Flange protection tiles are held under the beam flanges by dove-tailed projections from the main blocks. Cinder concrete with nailing strips and finished floor is employed as usual and the ceiling may be plaster directly on the blocks. The floor differs materially from most of the construction in general use in that the material is designed to act as a beam or lintel instead of an arch. No centering is required for erection, and as there is no end thrust, no tie-rods are needed.

Melan Arch System depends mainly for its strength on the use of steel ribs (usually T's or light I-beams), or by latticed iron rods bent to the shape of the arch, and sprung from the lower flanges of the I-beams. A curved "center" is applied close to the under side of the ribs and then, starting at one beam, coarse concrete is filled in and rammed toward the haunches for a depth equal to about two-thirds of the depth of the curved beam. The remaining one-third is filled with a finer mixture of cement and sand. Each side is built

and rammed separately, and the key is then filled in and rammed vertically. This system has been used on spans of from 12 to 16 feet with the curved rib spaced 3 to 5 feet, according to strength required. The rise of the arch is from one-tenth to one-twelfth of a span. Tie-rods are used to take up the thrust. The use of this system may be criticised as the concrete is used as a beam and an arch at the same time. The closer the ribs are spaced, the less objectionable does his feature become.

Merrick System—Practically unused. Arch consists of ollow concrete or tile blocks forming a segmental arch on teel frame or the blocks may be placed between concrete rches reinforced with iron rods. In the latter case, the span etween the arches is about 25 inches. For a smooth ceiling, xpanded metal lath with plaster is used.

McCabe Arch—Made of patent fireproof blocks supported y "T" irons which rest on the lower flanges of "I" beams.

Metropolitan System consists of a composition plate with ire suspension cables instead of metal bars for the metal embers. These cables are anchored to the walls and laid ross the tops of the beams and spaced from seven-eighths one and one-half inches on centers according to the spans d loads, and are laid parallel. Lengths of seven-eighth und iron rods are laid on the cables below the top of the am, so as to deflect the cables uniformly three inches bew the tops of the beams in a six-foot span. Centers are en placed between the beams and one inch below the iron ds. A composition formed of about one part plaster of ris by bulk to two parts of spruce or hemlock planer shavgs, with sufficient water to mix thoroughly, is then poured to place and tamped, and brought to a level one-half inch ove the tops of the beams. This forms a floor plate four ches thick ready for filling, screeds and wooden floor. The rtions of the beams below the ceiling line are protected a two-inch thickness of a composition poured at the me time the plate is made, into forms left in the centers. e flanges of the beams are wrapped with wire netting fore the composition is poured.

Sawdust is used *in the* composition of the Metropolitan

floor. They use plaster of paris and one or two-inch lengths of planer shavings. This construction is used somewhat in apartment houses. They put heavy plank floors on top and anything of weight is screwed through the plaster to the floor. In the Metropolitan floor the under sides of beams or girders are protected by making a mould between the "center" and pouring around the beam. The material is mixed up in such a liquid form that it can be poured. This type has been tested and accepted by some city building departments. During the fire at the Seaboard warehouse, 435-41 East 48th Street, Feb. 17, 1919, the fireproofing of the steel work held sufficiently long to insulate the members from the heat, so that there were comparatively few failures considering the intense heat. Considerable of the fireproofing was loosened or washed off by the hose streams or by the long water soaking. The fireproofing which remained intact showed evidence of the gypsum being washed out about an inch from the surface. The wire reinforcement on the under side of the arches is exposed.

Mushroom System—A reinforced concrete arch in which the steel rod reinforcing members run diagonally across the slab from column to column. Similar rods run from column to column along the outer edge of each panel or arch.

New York Reinforced Arch—An end construction terra-cotta arch designed especially for hotels, apartments, residences and offices, where a light floor only is required. New York City Building Department permits 6-inch blocks for 6-foot spans and 8-inch blocks for 7½-foot spans for a live load of 150 lbs. per sq. foot. Half inch Portland cement mortar joints are used between the successive arch courses, in which a specially designed wire truss reinforcement is used. The floor is built up to the top of the "I" beams with cinder fill. There are various other arrangements for constructing.

Pelton Arch—Composed of concrete, plaster and sawdust or wood chips. Practically obsolete.

Ransome System—Use square steel rods, twisted cold, for reinforced concrete construction.

Rapp System uses rolled sheet iron. T's laid on the bottom flanges of the beams spaced 8½ inches on centers,

eld in position by spacing-ties. Bricks are then laid beveen the T's and grouted, and the space up to the top of :am filled with cinder concrete made of about one to eight oportion. The lower flanges are wrapped with wire lath d plastered when the ceiling is finished.

Roebling System uses a steel-ribbed wire cloth centering d a cinder concrete arch or plate. This centering is pernent and is sprung into place between the lower flanges the beams, and the adjoining sheets are lapped or laced. ıder concrete is then filled in up to the top of the beam ing a thickness of not less than three inches at the crown. vire lath ceiling may be suspended under the arch of the m flanges, or the beam flanges may be protected by : lath filled with concrete. The latter method is much er. If no suspended ceiling is used, the lower flanges he beams are protected by only about one inch of plas- on wire mesh.

huster Long Span Floor Arch is composed of terra-cotta ks with concrete between each block and a concrete ing several inches thick.

parately Moulded—See Unit System.

'russit" System—For light concrete roofs, curtain walls solid partitions. Trussit is corrugated, expanded steel, 'orcing sheets, made in form of continuous "V's," erected out forms or centering. Made by General Fireproofing

'uss Con Arch—Consists of a segmental sheet of iron, :h also acts as a centering, with the lower edges flared and resting on the lower flanges on the "I" beams, and vhich is formed the concrete floor arches. In some inces reinforced concrete beams and girders are used, in :h case the beams and arches are laid at one time. Iron ; reinforce the concrete.

nit System of concrete arch, sometimes called "separate- ıoulded," consists of reinforced concrete slabs, blocks or :r members which are moulded in units either at the site :he structure or at the factory. These are put in place ı the reinforcing steel rods protruding and the intering space or joint is filled with concrete.

Waite, Guy B., System—Concrete arch reinforced with steel rods, usually panelled. On the wooden form, a layer of 1-inch concrete is laid, on top of which steel rods are loosely laid, extending from beam to beam. The webs are filled in with concrete, and on the lower flanges of the "I" beams clips are fastened, supporting a protection of concrete 1½ inches thick.

Wiscoform Arch is similar to Truss-Con arch.

FLOOR AREA—See Area.

FLOOR LIGHTS—Heavy glass in wood or iron frames inserted into the flooring to give light to floor below. In non-fireproof buildings if the glass is at least ¾-inch thick in iron frames, no charge is made in some of the local rating schedules.

FLOOR OILS—See Mops.

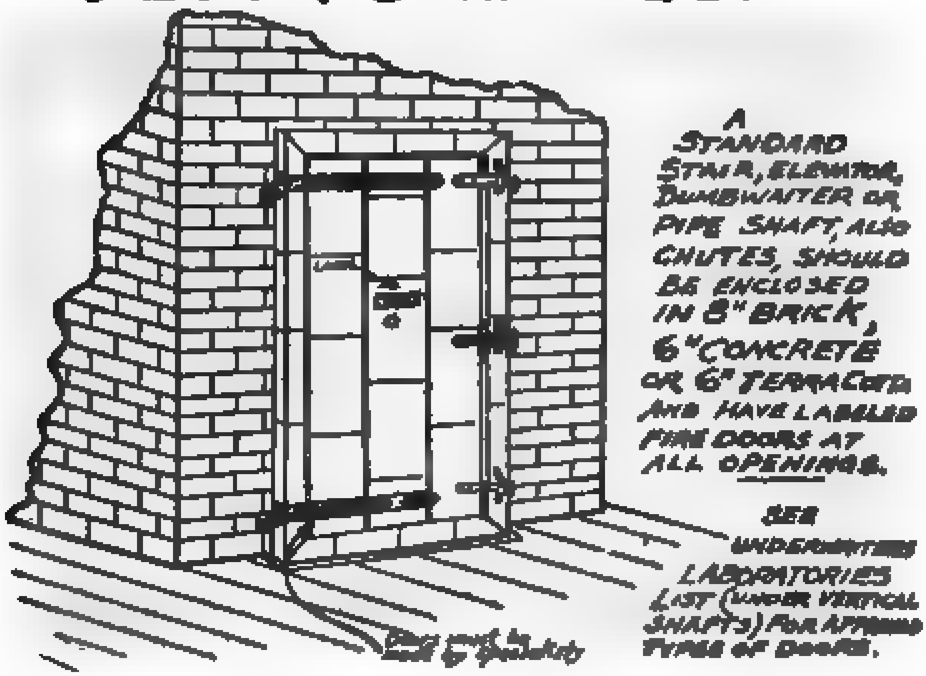
FLOOR OPENINGS should be protected in a standard manner. See Illustration on page 273.

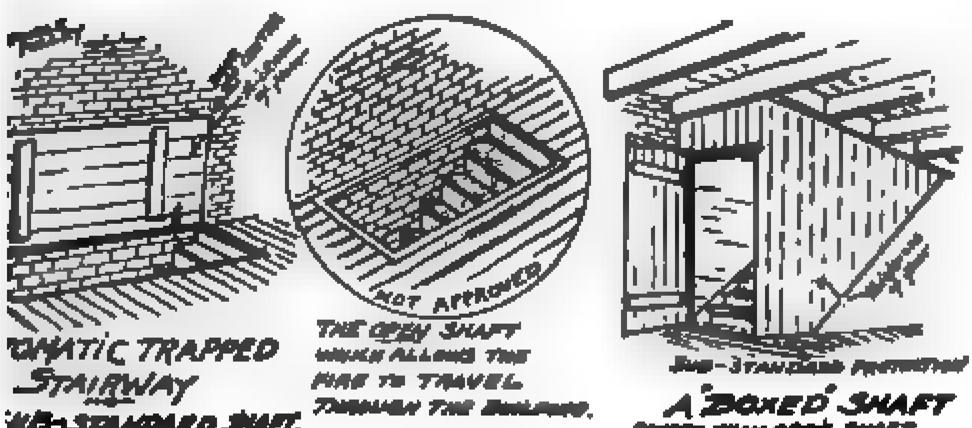
FLOORING, COMPOSITION—Used in place of linoleum or cement-finished floors in office buildings. The compositions vary, but the ingredients are asbestos pulp, wood flour (pulverized poplar), paraffine oil, cement, silax, manganese, chloride of magnesium, graphite, talcum, marble dust, iron oxide, chrome and earth colors, aniline colors, magnesite and lamp-black. The majority of the compositions contain 25 to 40 per cent asbestos. The hazards are mixing, blending and cooking the various ingredients. Steam kettles are usually employed; also (burr stone) grinders for powders and hydraulic presses. The dressing, applied after the flooring is laid, consists of linseed oil, oxide and aniline colors and turpentine. Usually air dried. To clean the surface of coloring matter foreign to the composition and also for a dressing or polish a mixture of linseed oil, resin, acetone, alcohol and nitric acid is used. Waxed with paraffine. Asphaltum is sometimes added for waterproofing. Direct heat for wax is objectionable.

FLOORS—See Watertight Floors.

FLORISTS—The fire record of this class is good. Few companies write stock of live plants as a very little heat will *ruin the entire* stock. Owners, therefore, cannot afford to

STANDARDS FOR FLOOR OPENINGS.





a fire. Storage of large quantities of moss and painting ames are principal hazards.

orists occupying small buildings at times decorate the e interior and front of building with white birch bark or ar fast burning material, adding to the hazard of spread- ire. *See Hot Houses.*

FLOUR is one of the best extinguishers for a fire caused by the spilling of and ignition of kerosene. **Flour** in bags, if wet, will cake, spoil and constitute a heavy loss. In barrels, it is considered good insurance.

FLOUR BOLTING CLOTH is mainly imported from Switzerland. It is hand woven and of different mesh. Easily damaged by heat.

FLOUR MILLS—After the grain has been thoroughly cleaned it goes to the roller mills to be ground, the stock being separated by sifting machines. After each grinding, the coarse stock goes back to the "breaks," and the fine passes to the purifiers and between smooth rollers, and then to the flour bins. In short, flour making is a process of separation, the desirable parts being slowly subtracted until only the waste or by-product is left. The hazard consists of dusty bearings and dust-laden atmosphere. This class is not very attractive as a fire risk.

FLOWERS AND FEATHERS—Artificial flowers and feathers. Busiest season is September, October, January and February. **Leaves**: Mainly of muslin, sized with gum arabic, glycerine and paraffine, varnished and shellacked. Cut out of large sheets of cloth previously painted and dried. **Veins** are made in either cold or gas heated die presses. Painted with air brush, coated with paraffine (waxing), sprinkled with tinsel (ground glass and mica), for frosting and dew. **Tubing**: Hollow muslin is used for stems. The muslin is treated in a bath of warmed linseed oil, cut into strips and drawn through a "tubing machine." This machine resembles a metal box on an iron table, with two rows of holes in the sides through which the strips are drawn. It is heated by gas and the gas connection should be iron piping.

"Flock" tubing is ordinary tubing covered with hair wool flock. **"Ciroleum" tubing** is made of a mixture of gly erine and gelatine to which are added small seeds. W made up it resembles rubber. Steel wires are covered the mixture, allowed to cool and wires are then withdra leaving a hollow tube. See Flock.

Flowers are made of silk, brocaded cloth, velvet, etc., *by hand or power* die presses and colored with anilines

and or air brush. **"Goffering"**: Goffer irons are small gas-eated tools, with ball-end and wooden handle. Used to ound out petals. **"Gripping," pinching** and **crimping** are one on gas-heated appliances. The work consists merely of easing or crimping the edges of the flower. Some flowers e of paper, worked cold, then dipped in wax. The heating the wax kettles is important. **Metal flowers** are stamped it of sheet tin, and are painted and then soldered to wire ames. Painted in dip tank.

"Peps" are small berries, pollen stems or flower centers. ade of a heavy thread in an automatic machine, stiffened th sizing of gum arabic and starch, dipped in paste paint d dried in gas-heated machine. Cherries and fruits are ide of cotton, moulded in treadle machines, dried, painted d varnished.

Preserving and Fireproofing of Natural and Artificial Fo-ge—Mixture contains sulphate of ammonia, silicate of la, rock salt, sugar, glucose and chlorine. It is mixed in oden tanks and into which the foliage is immersed. Deli-e plants are first dipped in a gelatine and paraffine bath. is process does not fireproof, but renders the foliage slow ning at ordinary temperature. Plants are bleached with ited sulphuric, hydrofluoric and acetic acids.

'eathers used in millinery are mainly ostrich. Chicken thers are used for quills and wings. **Raw ostrich** feathers kept in bins according to quality. They are sorted, shed, whipped by hand to open up the flues, dyed and ed. **"Branching"** is the term applied in making up feathers bunches or branches. Rubber cement is used from open s. Tips are colored by hand or air brush with aniline ors, and dried in gas-heated ovens.

Ramie—Used in making artificial plumes. It is sewed on tting frame, steamed, curled and tinted with aniline colors air brush. **All flower stocks are very susceptible to fire, oke or water.** In making leaves the handling of acetone, yl acetate, turpentine, alcohol, benzine, liquid bronze, r boxes, celluloid for leaves, gas-heated machines, waxing, d dyeing are the main hazards. Fire record of this class

is poor.—(W. O. Lincoln, "Live Articles on Special Hazards"—The Weekly Underwriter.)

FLOWERS OF SULPHUR—Obtained from sulphur in the shape of a fine crystalline powder.

FLOWING PRESSURE—See Static Pressure.

FLUE—The enclosure by means of which heated air or gases are conducted to the outer air, as a smoke flue from a smoke pipe.

FLUE DUST may be very inflammable if metallic zinc dust is present.

FLUE FIRES—Four or five pounds of common salt poured down the chimney will probably put out the blaze. The carbonic acid gas so generated is a fire extinguishing agent.

FLUE HOLES (Openings)—Many fires are caused by sparks entering rooms and igniting stock, or in the case of vacant rooms, igniting rubbish or the wooden floors. These flue holes are often left open by tenants moving who have had the smoke pipes of their coal stoves connected to them. All unused flue hole openings should be filled in with brick or mortar, or at least provided with a metal cap. Sometimes flue holes are merely covered with paper which forms an excellent chance for a fire to originate.

FLUFF—The soft loose down broken away from fibres of cotton, wool, flax, etc., while in the state of manufacture.

FLUORIDES—Compounds of fluorine with metals (calcium fluoride). No fire hazard.

FLUORINE—Unites with all elements except oxygen. When it unites with hydrogen it explodes.

FLUXES—Various substances used to prevent the instantaneous formation of rust when welding two pieces of hot metal together.

"FLY"—The linty dust produced at textile (woolen, cotton, etc.) working machines. It is one of the main features to be watched by the inspector when inspecting a knitting mill. It is always present in the card room, more especially where all cotton or cotton waste is used. See Knitting Mills. *See Dust.*

FLY WHEEL—A heavy revolving wheel used for equalizing the motion of machinery.

FLY WHEEL PITS are the cause of many fires. In one instance a steam syphon was located in the pit and the engineer entered the pit with an open torch and an explosion and fire resulted. The real cause of the fire was the oil and grease which had been allowed to accumulate in the wheel pit. The oil and grease had become volatilized by the heat from the steam syphon so that when an open flame was introduced, a fire immediately occurred. These wheel pits should be kept clear of oil and litter.

FOAM EXTINGUISHERS—See Extinguishers.

FOAMING—An undue amount of boiling, caused by grease or dust in the boiler.

FOAMITE—See Extinguishers.

FOAMITE FIREFOAM—See Oil Tank Fires and Protection Against.

FOIL—See Tin Foil.

FOLDING BOX MANUFACTURING RISKS are better than solid box makers because less gluing is done, fewer machines used and goods are packed flat instead of in solid form. Flat packed stock offers more salvage and presents a less crowded condition. See Paper Box Factories.

FOOT-POUND—This term can be easily understood as follows: If you lift a weight of one pound to a height of one foot you have done a foot-pound of work. If you lift it two feet you have done two foot-pounds, and if you lift three pounds six feet you have done eighteen foot-pounds of work. In other words, the product of the weight and the height give the foot-pounds. Or force times distance will also give the foot-pound measurement. If you exert a pressure of 10 pounds through a distance of ten feet you will have exerted 100 foot-pounds. Watt discovered that a dray horse when not tired could do 33,000 foot-pounds in one minute and this unit is called a horse-power. Thus if an engine hoists a weight of 330 pounds through a distance of 100 feet in one minute, it is exerting one horse-power. See Horse-Power.

FOOTS—*The name given* to the remaining mass (con-

Courtesy Foamite Firefoam Co.

Oil on Fire. Note dense smoke.

Courtesy Foamite Firefoam Co. Fire Extinguished by Foamite.

sisting of soap, mucilaginous matter and more or less refined cotton seed oil) in the process of cotton oil refining.

FOOT-VALVE—The check in the lower end of a pump suction pipe preventing the backward flow of water once raised in the suction. See Strainer.

FORECLOSURE PROCEEDINGS—Most policy forms covering property, especially in the larger cities, permit foreclosure proceedings to be commenced or notice given of sale by virtue of mortgage or trust deed. Without this feature in the form or an endorsement granting permission such action would render the policy contract null and void.

FOREIGNERS, who are natives of countries where long names predominate, frequently abbreviate or entirely change them to names of American pronunciation, usually for no ulterior purpose, but proper name should be ascertained, if possible. See Names.

FOREST FIRES—In New York State, the Bureau of Foresty has inaugurated a system of telephone communication from about fifty stations on high peaks from whence the fire rangers can call for help if fires are discovered, supplanting the old method of having the ranger ride to the nearest settlement for help and thereby giving the fire a chance to spread. The Bureau reports state, that causes of fire in order of their importance are: Railroad locomotives, lightning, careless campers, fishermen, hunters and settlers clearing land. There are three kinds of forest fires—the "surface fire," which merely runs in the leaves and ground litter; the "ground fire," that covers the underbrush and dense forests, and the "crown fire," the more dangerous and terrifying of all. A "crown fire" is usually caused when the ground or surface fire reaches the top of a ridge or knoll and the increased draft carries the blaze up the trunks of the trees to the tops of the "crowns." It is the crown fires which have made the great forest fires of history. Surrounding the burning area by a trench from which everything down to the mineral soil has been removed, is the only kind of a fire line which will stop a ground fire, and it will often stop a surface fire. For surface fire "whipping" or *using brush* branches or water soaked sacking to whip the

burning leaves at the edge of the fire back into the burning area is most effective. Sand as well as water is valuable in fighting this kind of fire, too. There is only one way to fight a crown fire. That is by back firing—fighting fire with fire. This method is extremely dangerous, consisting of setting a counter fire far enough from the main body of the original fire so that all inflammable material will be burned by the time the fire reaches that point and the fire will die from lack of material to feed on. The backfire is set far enough from the main fire to escape the draft which is fanning the blaze.

FORGE HAMMER—A heavy hammer worked by machinery for forging large pieces. See Anvil Manufacturing.

FORGES—Protection of woodwork around same with incombustible material, at least 4 feet in front, and sides, is essential to guard against fire from flying sparks or hot metals. Stationary forges are preferable.

FORMALDEHYDE—Used by embalmers and also as a preservative and fumigator. A gas at ordinary temperature. Not very inflammable.

FORMATES—Formic acid compounds. No fire hazard at ordinary temperature.

FORMIC ACID—A colorless liquid of pungent odor. No fire hazard.

FORMS—Following is a list of the general forms in use: Rent, Church, Household Furniture, Retail Stock, Merchandise, Stock and Machinery, Stable, Contractors, Commissions and Profits, Use and Occupancy, Profits, Leasehold, Dwelling Building, Manufacturing or Mercantile Building, Office Furniture and Fixtures, and Personal Effects. The best form, whether viewed from the standpoint of the Assured or Insurance Company, is one which expresses in clear, unambiguous language, the mutual intention of the parties, and affords no cause for surprise on the part of either, after a loss has happened. The preparation of such a form is not an easy task and this is the point where the ability of the Underwriter and Broker come into play. The longest form may afford the smallest indemnity. Many a good form has been weakened by the addition of

unnecessary words,—placed there by brokers for the purpose of broadening the coverage, but by their very nature tend to limit the coverage. Vital points should be covered and useless phrases omitted. The ideal form is clear, concise, complete and short.

Forms from the Broker's Standpoint:

The ideal method of insuring from the standpoint of the insured would be a simple contract reading: "On Buildings and Contents of every description." In order to blanket buildings and contents, the assured would have to pay the contents rate. We will, therefore, assume forms to be specific on buildings, specific on stock and specific on machinery. The building form may include engines, boilers, heating, ventilating, lighting and electrical apparatus, elevators, etc., and all permanent fixtures in the building. In a large number of instances the courts have held these particular items to be permanent fixtures to the building.

Machinery Item may include machines, machinery, tools, implements, apparatus, appliances, furniture, fixtures, signs, awnings, etc. There should be, however, a clear dividing line between machinery enumerated under the building item and the machinery insured under the machinery item. One method is to employ the following expression: "It is understood and agreed that property specifically enumerated under the building item is not considered as covered under this item, namely, machinery item." Conflict between the building and machinery items is more apt to happen in connection with such articles as shafting, belting, pulleys and hangers, and it has been common occurrence to find these articles insured under both items.

Stock Item—In a manufacturing plant, the correct method of describing the property insured is, "On stock, samples, materials, boxes, cases, labels and supplies, manufactured, unmanufactured and in the process of manufacture," without any restricting or qualifying clauses or phrases as to the kind of stock. In a mercantile risk, a method of description is as follows: "On merchandise, samples, materials and supplies," without any restricting phrases as to the class of *merchandise.*

The "commission" and "in trust" clauses usual to stock and merchandise forms, namely, "Their own, or held by them in trust or on commission, or sold but not delivered or removed, or for which the assured may be liable, and the property of others on storage or for repairs." These phrases are for the purpose of bringing under the protection of the policy the property of others in the care and custody of the assured for which he desires protection. Since the decision in the Utica Canning Co. vs. The Home Insurance Co. 116 N. Y. Sup. 934, where it was held that the words "in trust" included all property in the care and custody of the assured, regardless of his liability, some have come to a radical change of opinion as to the desirability of employing the phrase "in trust" in policy forms. Having in mind the operation of the co-insurance clause, one can appreciate how dangerous this clause might be in the case of printers, laundrymen or finishers who at times have property of others to a very considerable amount on their premises, for which they are not legally liable and which they never contemplated should be covered under their contracts. If no goods are held on storage, or for repairs, a good expression is the following: "Their own, or the property of others for which they may be liable." Of course, this latter clause also should be applied on policies insuring machinery. If there be property of others held on storage, or for repairs, it is essential that it be noted in the policy. (Extracted from lecture: Forms from the Broker's Standpoint by Julian Lucas, Jr.)

Forms from the Company's Standpoint:

In a stock and fixture form, policies written in the name of John Doe & Co. for account of whom it may concern, should have a clause reading: "Loss, if any, to be adjusted with and payable to John Doe & Co."—do not say, "Loss, if any, payable to assured."

In a household furniture form, covering property of assured or any member of the family, etc., a clause reading: "Loss, if any, payable to assured" should be attached. In a household furniture form covering all other property, form should read: all other "household property" or all other

"similar property," so as not to be construed to cover on stock or articles excluded in the policy.

On building forms, when **machinery** is included, should read: "pertaining to the service of the building or the furnishing of power therein" so as not to be construed to cover manufacturing machinery. When fixtures are included, should read: "belonging to the building" or read "permanent fixtures" so as not to cover store fixtures.

FORSITE—An explosive material. A foreign make of nitroglycerine. Considered more dangerous than dynamite.

FOUNDATION WORK—Foundation work calls for the best engineering skill, and the design and construction involved requires much study, as each problem demands a special solution. The best condition from an economical point of view is to have the level rock just below the cellar floor of a building; if the rock is higher the expense of excavating is large and if lower the footings must be carried to bed rock. Ordinary ground will maintain safely a load of 2 to 4 tons per square foot, dry clay from 4 to 6 tons per square foot, and gravel from 6 to 10 tons per square foot. Having these figures in mind, the necessity for footing buildings on good bed rock will readily be seen if we consider the fact that one of the New York skyscrapers weighs approximately 120,000 tons, with a wind pressure on building surface computed at 40,000,000 pounds. The cellar flooring of high buildings usually runs from 30 to 45 feet below the street, and if rock is not encountered at that depth, it becomes necessary to foot the foundations on concrete piers sunk to meet the bed rock; and if the rock is below the water level, or at a considerable depth below cellar excavation the only known way to reach it is by means of the **pneumatic caissons**. These caissons are simply air-tight bottomless boxes, rectangular or cylindrical in cross section, and equipped with a steel reinforcement on bottom which is known as the cutting edge, the interior being large enough to accommodate a gang of men whose duties are to excavate the space within the area which it covers.

Prior to putting the caisson in place, a pit sufficiently large to allow for its entry is dug in the ground on the site

:h the finished pier or monolith will occupy, a derrick is alled and the caisson seated accurately in place to a th usually 6 feet below the main excavation. When in :e the caisson is provided with a strong decking which ws a height of about 6 feet for workmen within the mber. On top of the caisson decking vertical sections of shafts are set up, these sections being usually circular in n, three feet in diameter, made of steel plate, each sec- ı measuring about 10 feet in length, and forming a means passage to the working chamber for men and material. 'he air lock is placed at top of shaft and usually consists ı steel cylinder about 5 feet in diameter, 7 feet high and :ed in position.

'here are two doors in this chamber, one at the top and near the bottom; an attendant is stationed on a platform r the upper door, whose duty it is to regulate the air ssure, attend to signals from working chamber and open shut the air-lock doors as required.

Vhen the outer door is opened, the inner door is closed, vice versa, thus retaining the pressure in the caisson. nal is made by whistle operated by compressed air within chamber, a valve and the necessary piping being pro- :d for this purpose.

ladder is installed within the shaft and workmen travel ınd from the working chamber by this means.

xcavated matter from working chamber is loaded in ıll canvas bags and carried by workmen to air lock, or ı blown out by the compressed air through special pipe, these methods have been improved on recently and it ow possible to use half a cubic yard bucket without inter- ng with the caisson efficiency.

Vhen the caisson and its appurtenances are put in place, crete is poured around the air shaft so as to form slabs ut 12 inches thick, this having sufficient strength to port a mass of wet concrete on caisson walls; sections of ıhaft are added and concrete is filled within the forms ; foot courses until the pier is built up to about one-half full height. As the top of the piers are to be sunk ow the temporary surface of excavation they are enclosed

within coffer-dams placed 3 or 4 feet beyond, these coffer-dams serving to exclude the earth from the column piers until such time as the open excavation is completed.

Forms are set up within the working chamber and con-crete is built up to the desired height, after which it is sunl through the water-bearing ground, compressed air bein used as the sinking progresses below water level, whe another section of concrete is added, and so on until th anchorage point has been reached.

Owing to frictional resistance it is necessary to use ca iron blocks to weight the caisson for the purpose of sinkin and this, in addition to the weight of the caisson, forces th work downward until the footing is reached, when the su face of the rock is cleaned and leveled, after which th whole interior of the caisson and shaft connecting the worl ing chamber with the atmosphere is filled with concrete we rammed into place, thus forming a monolith upon which t support the superstructure.—(Robert H. Pearson.)

FOUNDATIONS—The bases of walls, piers, column etc., directly supported or kept in equilibrium by the eartl

FOUNDATIONS FOR SKYSCRAPERS are sometime laid as follows: Heavy, hollow steel piles are driven throug quicksand and to rock. They are then cleaned out wit compressed air and then two-inch steel rods inserted t act as reinforcement for the concrete which will eventuall be poured in. This system of foundation work is use because it is much quicker than the former method of sinkin an open pit to rock.

FOUNDRIES—Usually large area frame buildings. Haz ards are pattern and flask making, preparation of the moul including core making, melting and reduction of the meta to a proper fluidity, pouring the molten metal into the mould cleaning and finishing the casting, also core ovens an painting iron or wood patterns. When casting, a man shoul be stationed on the roof to detect flying sparks alighting o the roof or on nearby structures. Casks of water with fir pails should be placed every fifty feet over entire roo There should be 12 inches clearance around floors or roo *where stack from* melting furnaces passes through. In cas

of fire, no water should be thrown on molten metal as this produces oxyhydrogen gas and is apt to cause a dangerous explosion scattering the molten mass. Carbon dioxide is a very good extinguisher, providing the seat of the fire can be enclosed. Brooklyn, New York City, has recently experienced a number of fires in this class. See Core Ovens and Cupola.

FOUNDRY FLASKS—Frames are of wood or iron, four sided, without top or bottom. Used to hold the sand moulds in position. Wooden ones frequently become charred from molten metal and losses occur from storing these flasks inside of buildings or against wood partitions where hidden sparks break out into fire.

FOUNDRY SAND—"Water-proof" sand used by founders when casting in sand moulds is composed of ground resin, flour and a secret white powder which prevents the molten lead from adhering to mould. Process is grinding, mixing and heating resin by direct heat. Non-hazardous.

FOURDRINIER MACHINE—A paper-making machine in which the pulp is screened and made into sheets. See Paper Mills.

FRACTIONAL DISTILLATION—A process of distilling a mixture of several liquids having different boiling points, for the purpose of separating them from each other.

FRAME—A term used when pieces of timber are put together so as to form a truss or other structure.

FRAME CONSTRUCTION—See Balloon and Braced Frame.

FRAME ROWS—Many of these rows have open spaces called cock-lofts, roof spaces or small attics, which are open from one building to another. This space is between the top floor ceiling and the roof. It may be from 6 inches to 5 or 6 feet in height. Besides containing considerable dust and shavings left at the time the building was erected, they are sometimes used for storing old mattresses and junk of all kinds. Fires in these concealed spaces are hard to locate and extinguish. The tendency of a fire to spread through these spaces is greatly increased by the pressure of the air and hot gases produced by combustion. Hot

gases always rise, therefore the danger is greater directly under the roof. Partitions of incombustible material extending to under side of roofboards should be placed on each side of the studs between buildings in roof spaces. The fire record is very bad. See Attics; also Roof Spaces, Cock-Loft, and Brick-filling.

Result of fire in a frame row.

FRAMING AND TIMBER WORK—See Braced Frame and Balloon Frame.

FRAUD—See Misrepresentation.

FREE WAREHOUSES—See Storage Stores (bonded and free.)

FREEZER—In cold storage risks, term used to designate temperatures from 10 deg. F. above zero to 10 deg. F. below zero. See Sharp Freezer.

FREEZING WEATHER—See Fire Appliances; also Fuel.

FRENCH POLISH is a polish formed by dissolving shellac in spirits of wine.

FRETWORK MANUFACTURING—See Cabinet Factories.

FRICTION (revolving) is the friction of journals and bearings of every description. **Roller friction** is the resistance offered by the circumference of the wheel of a vehicle to the propelling power. **Sliding friction** is the friction of two flat surfaces as in a planing machine. Friction is worse in suction pipes than in discharge pipes.

Friction Wheels—Wheels so placed that the journals of the shaft may rest upon their rims and thus be enabled to revolve with diminished friction.

FRICTION ELEVATOR HEAD—A small paper friction roller or pulley keyed to the main shaft and rotating against the periphery of a large iron pulley which drives the bucket belt.

FRICTION LOSS in fire hose. From experiments of J. R. Freeman. In pounds per hundred feet, with various amounts flowing. Nominal diameter 2½ inches; actual approaches 2⅝ inches.

	Gallons Flowing					
	100	150	200	250	300	350
Unlined linen	5	12	21	33	46	62
Rubber-lined, fair ...	4	10	18	29	40	54
Rubber-lined, good ..	2	5	9	14	20	27

3-inch hose about 40 per cent of the above.

Friction Loss in water pipes is determined by loss in pounds pressure per square inch for each 100 feet of length in different size clean iron pipe discharging given quantities of water per minute.

FRICTIONAL ELECTRICITY—See Static Electricity.

FRIENDLY FIRE—One that does not leave its seat of origin, as, for instance, a smoking oil stove or oil lamp, charring from radiated heat unless fire ensues (like charred beams under a furnace). The damage caused by friendly fire is not covered by the fire policy.

FRIEZING MACHINES—Sometimes called a shaper, used by woodworkers. These machines consist of two vertical spindles projecting up through a table and rotating

rapidly in opposite directions. Each spindle carries cutters of various designs as desired. They are used for beveling and making edge mouldings. Considerable dust and refuse is made.

A Friendly Fire.

FROSTING GLASS—Can be accomplished by mixing powdered ammonia fluoride and acetic acid and dipping the glass therein.

FRUIT EVAPORATORS—Fruit is pared, cored, trimmed, bleached with sulphur fumes, sliced, dried and packed. Evaporators resemble a brick kiln having steam or furnace heat, with furnace set in kiln and fruit on slatted floor above.

Bleaching with sulphur fumes, in separate building, or by putting fruit on a belt-conveyor and passing it through a bleaching box. In both methods a pot of burning sulphur is used. Fruit-preparing is usually by machinery. Busy season, September to January.

FRUIT JUICE MANUFACTURING—See Flavoring Extracts.

FRUIT PRESERVING AND CLEANING—Raw mate-als consist of tapioca, currants, dates, raisins, citron, etc. achinery consists of raisin-seeding machines, currant-wash-g machines, steam kettles, dry-rooms and tubs of syrup. ot a desirable class.

FRUIT STORES—Owing to health board regulations, re-iring certain fruits, shelled nuts, etc., to be covered, deal-s are using sheets of celluloid for a covering. In large res, considerable quantity of celluloid is likely to be kept hand. If the store is well established, it is considered sirable. Salvage in case of fire is very small. After a unless adjusters "get on the job" immediately, entire ck is liable to be confiscated by the Health authorities.

FUEL is a substance whose combustion in atmospheric gen can be utilized as a source of heat energy for com-rcial or domestic purposes. It is residuals from crude roleum after removal by distillation of the lighter hydro-bons, such as benzine, gasoline and kerosene.

n zero weather, the supply of coal should be carefully ed by inspectors as experience has shown that a lack of ply may lead to the crippling of the automatic sprinkler ipment due to lack of heat. See Fire Appliances.

FUEL OIL is crude oil with some of the lighter hydro-bons (gasoline, benzine, etc.), removed, leaving the heavy oil. Flashes usually at about 150 deg. F. Classed as -volatile. Should have a steampipe or other device such a blanketing gas or foam for extinguishing fires. Con-or pipes to be run underground with accessible gate ves to shut off supply. In large units, tanks should pref-bly be buried under ground rather than above ground. e Petroleum, also Oil-burning Equipments. See Concrete nks and Oil Tanks.

FUEL OIL ENGINES—See Kerosene Oil Engines tationary.)

FULCRUM—The point about which a lever turns.

FULL RISK—A risk on which a company is committed the full limit of the amount it cares to accept. In other rds, the company has written all the insurance it cares to cept on the particular risk. See Lines; also Risk.

FULL WAR COVER—See War Risk Insurance.

FULLER'S EARTH RECOVERY—Earth saturated with oil is removed from filter presses and placed in steam stills where oil is driven off and recovered as refined oil. The earth thus freed is calcined to remove all volatile and organic matter, and, after cooling, is ready for use again.

FULMINATE OF MERCURY is made by dissolvin mercury in strong nitric acid. It is extremely sensitive the heat of friction and is handled immersed in water alcohol to prevent explosion. Used in ammunition works

FULMINATE OF SILVER is a grayish white crystalli material used in torpedoes. More sensitive than mercu fulminate. Liable to spontaneous combustion.

FULMINATES—These metallic salts are explosive w heat or friction. Should be kept away from mineral aci carriers of oxygen, liquefied oxygen, organic substances a sulphur. If water or other liquid with which a fulminate h been mixed is sprinkled about and the drops left to dry, t slightest residual traces of the fulminate will explode themselves, the greatest violence being exhibited when th are exposed to the rays of the sun. Even the dust swe up in fulminate works has a tendency to explode spont neously.—(W. D. Grier.)

FULMINOSE—Cellulose changed by heat.

FUMES—See Gasoline.

FUMEXER—Trade name for an apparatus for venti vapors from inflammable liquids. It is a curved metal ho with wire glass side and back, equipped with suction f for drawing off vapor from air brushes, and a drip pan f catching excess liquid.

FUMIGATION—Carbon bisulphide is sometimes used tobacco factories to exterminate insects.

FUMING SULPHURIC ACID—Used in fortifying t mixed acids used for nitrating. See Oleum.

FUMOTH—Used in fumigating as a protection again the Mediterranean or flour moth. The process is: Slo burning paper is saturated with a secret material (moistu and a product of tobacco). This paper is slowly burned *a coal stove or* other receptacle which has ducts leading

the machinery or elevator legs, etc. The fumes are forced through the machinery parts by means of a slowly-revolving fan. The outlet from these burning fumigators is protected by a double wire gauze, and the intake air is also protected with wire gauze.

FUNGICIDES—See Insect and Vermin Exterminators.

FUR INDUSTRY—The fur industry is very extensive. The class of employees is largely of foreign type. The larger and more important shops are well cared for, and attention is given to the matter of cleanliness; but the middle or smaller classes are generally crowded and untidy, and the employees are addicted very much to cigarettes. It is a common occurrence to open the shop door unexpectedly and see an employee smoking with a "SMOKING PROHIBITED" sign directly in line of his vision, then to ask the shop foreman if he allows smoking and receive his innocent reply, "Never." Then the inspector leads the foreman to the offending employee, who, of course, claims he was never told not to smoke in the shop, and then the matter closes with a promise from both foreman and employee that it will never happen again, and the inspector knows as well as they do that neither one expects to make good his promise.

There are many failures and fires in the fur trade. The manufacturers, of small means, are severely handicapped. There are, practically speaking, three grades of furriers. The first grade usually has first selection of importations; the second-raters, the second choice, and the third-rater takes what is left and usually pays as much as others for an inferior article. It is in the last class that most failures occur. The better the skins, the more easily they are manufactured and at less expense, and the third-rater therefore has an added expense to cover up defects.

The fur industry is divided into many parts, namely, the sale of raw skins, the dressing of skins and the manufacturing of hatter's furs, of dressed skins into garments, of muffs and boas, of robes, of caps, of fur tails and heads; also, the trade of the taxidermist, who by his art of dressing and

stuffing, produces the animal hide in a form representing its natural outline.

We will endeavor to consider these departments and point out the hazards connected with each, so as to give at least a faint idea of them.

In the capturing of the animals, it is most desired that they shall be trapped rather than shot because in trapping only the skin of feet or neck of the animal is punctured, while in shooting, the body skin is usually damaged, thereby reducing the value.

Skins are known as the **seasoned** and the **unseasoned.** The better of the two are the seasoned, because they are captured during the coldest weather, that being the time when the hair is the strongest and most oily and the skin the toughest. In skinning the animal, the punching process is the best, because there is less liability of cutting the skin or having the flesh cling to it. After removing the skins, they are dried by natural air, and if the pelt is soft, it is sprayed with water to harden it. They are then baled for shipment, except the finest grade of seals, which are often salted down and packed in casks. When they are received by the dealers in raw skins, they are examined to determine whether they are **firsts** or **seconds** (those without knife cuts from the skinning process being the first).

Dealers in Raw Skins usually have drying and fleshing rooms. Herein lie the hazards in their class. The drying of the skins is usually done by gas heat and in frame enclosures with the skins hung on wooden racks. The room should be made of some fireproof material, the hangers of metal and the skins so arranged that if one or more should fall from their supports, they would not come in contact with the heating apparatus. Steam heat for the drying room is the most preferable from a safety point. All scrapings from the fleshing work should be placed in metal receptacles. Sawdust is often used for the grease absorption on the floor of the fleshing room. Sand is preferable; but no matter which is used, the sweepings should be removed at least daily.

The next to consider is the fur-dressing trade. The skins *are generally* received here in bales, but very often in loose

form, and stored in piles awaiting the process. In case of fire in the storage rooms, and the skins should not be burned but thoroughly water soaked, they should not be allowed to remain in piles over seven or eight days (the time being governed by the temperature), as they are liable to become heated and then fermentation would be rapid, and this would render the skin practically useless. The skins are in turn examined, and fleshed if particles adhere to them; then, if dirty or sandy, they are washed in plain water and dried by artificial heat, preferably gas. They are then **tramped.** This means placed in a barrel (one skin at a time) containing sawdust, and tramped upon by a man wearing light slippers. This makes the skin soft and pliable and also works out the grease which is absorbed by the sawdust. The skins are then **rolled,** e. g., drawn back and forth over round sticks by means of which they are stretched and flattened; and if any humps or ridges still exist they are skived, or trimmed down with a sharp knife. They are then cleaned in **drums,** which are large cylindrical-shaped casks practically resembling squirrel cages, which contain quantities of sawdust, preferably cedar wood dust. The drums are rotated by power, and the forced contact with each other, and the mingling with the dust, all serve to clean the skins and remove all remaining greases (at times charcoal stoves are placed under the drums in cold weather), and lastly, comes the hand beating with rattans, which serves to fluff up the fur.

There are times when the skins must be bleached or dyed. To dye them, aniline or logwood dyes, sumac, ammonia, sulphuric and nitric acids are used, and this is not a hazardous process. In the bleaching process, an air-tight room is needed; sulphur cakes are put in a crucible or pot which is set on some fireproof base, and the sulphur which is set on fire with a match, burns very slowly without a flame, practically smoldering, and gives escape to dense fumes which penetrate the hair and hide. Many firms have fireproof vaults in which the more expensive furs are stored such as Russian sable, silver fox and crossed fox. See Hides.

Manufacturing of Hatters' Furs is a very much more hazardous process *than fur* dressing, on account of the high-

speed machinery used. Hatters' furs are usually shipped n burlap-covered bales. Water, if clean, will not damage he stock very much if immediately salvaged, and providing he stock is not scattered about. Smoke has a bad effect on the stock because it is very hard to remove the odor. The stock on the pelts is a different proposition, and offers only small salvage. Felt hats are made of hatters' fur.

This specific work is the producing of the animal hair in proper condition for use by the manufacturers of felt hats and felted fabrics. The preferable skins to be used are the beaver, coney, rabbit and hare; because they are the most susceptible to the carroting process, which is intended to stiffen the hair for the cutting machines. **Carroting** means spraying on the hair, usually with a hand brush, of a weak solution of nitric acid, carrot oil and water. The skin then passes to the dryer, which is heated to about 150 deg. F. This process gives the fur its "felting properties," making it knit together when hot water and pressure are applied. At one time it was thought that only coal fires were proper for this drying, but that severe hazard is now eliminated by the use of steam. Previous to the carroting, the skins are examined and fleshed, if necessary, and after the carroting they are trimmed, that is, the irregular edges are straightened; then they go to the **combers** and then to the **shearing** and **blowing** machines. These machines remove the hair from the pelt and blow all foreign particles free from it. The blowers have separators attached and the hair and foreign particles are carried to different receptacles. The possibility of overheated journals covered with dust and hair and resultant combustion causing rapid flash fires is a serious feature. The finished product is packed in paper bags and burlap bales. The pelts are sold to tanners.

Fur Garment Manufacturing contains practically a tailoring hazard, with the additional feature of stretching and drying skins by nailing them on boards and standing them around coal stoves, or in small gas-heated drying rooms. After the drying, they pass in turn to the cutters, sewers, liners and finishers.

***Muffs, Boas and* Caps** are made largely by pieced skins

for the cheap grade stock, and of whole skins for the high-grade stock. One finds the hazards of the fur garment shop here with the additional and serious hazard of the use of cotton bats and shoddy, which are used for stuffing or filling purposes. The latter very naturally increases the possibility of an untidy shop.

Fur Tails are made from the clippings and waste. This class includes the poorest type of fur manufacturing, both from the standpoint of tidiness and rank of employees. Cutting and sewing are the only operations.

The Taxidermist is in a sense a part of the fur trade, in that he receives the skins from the fur dresser for mounting. The serious features in his shop are the storage and handling of materials for stuffing, use of waxes and paints for tinting and finishing, and woodworking, such as making of moulds, frames and bases. Materials used for stuffing are cotton, shoddy, excelsior and sawdust.

In conclusion, to sum up the brief hazards of the fur trade:

Dealers in Skins—Fleshing and drying.

Fur-Dressers—Fleshing, skiving, tramping, cleaning in drums, dyeing and bleaching and benzine for removing grease from heads.

Hatters' Furs—Carroting, cutting, blowing and drying.

Garment Manufacturing—Drying, cutting and sewing.

Muffs, Boas and Caps—Cutting, sewing, filling and drying.

Taxidermist—Drying, stuffing, decorating and woodworking.

The above all have a grease hazard to some degree.

Fur Tails—Cutting and sewing.

Fur Pointers—Use fish glue for setting seams.—(Chas. E. Jahne.)

FUR COLD STORAGE VAULTS—Rooms should be of small area and each equipped with ice house door entering vestibule and the inner door of two thicknesses of sheet iron interlined with 4-inch cork block. Direct pumping brine system with coils on walls. No blower or suction fans. Other requirements are:

Regular watchman and clock service, sprinklers on dry pipe line with control valve outside of vault. Automatic

m, expansion thermostatic operating at about 130 deg. F. connected with central station. Trouble alarm, consist- of electric thermometers. Approved electric wiring. ide switch with pilot light to indicate when lights are or off. Masonry walls 12 inches thick, insulated with ch cork block and cemented. Floors insulated and water- of with two layers of felt (tarred), 1-inch corkboard rnating and finished off with 2-inch concrete. Most of new cold storage plants use ducts for conveying the l air instead of the circulating systems. See Consequen- Damage.

UR HAT FACTORY FIRE—Caused by watchman open- door of alcohol recovery oven, the vapors therein being loded by the watchman's lantern. An approved watch- i's lantern should always be used.

URNACES—For installation of temporary kerosene oil ners. See Kerosene Burners.

URNACES (portable hot air type) should be placed at t four feet from any combustible partition or ceiling. If tected by metal shield, not less than two feet. Wood rs under furnaces should have sheet metal or one-eighth i asbestos covered with two courses of 4-inch hollow or equivalent; this in turn should be covered with boiler plate at least three-sixteenth of an inch thick. Three rses of brick, top course laid on edge, producing a ven- ing air space, may be used in lieu of the terra-cotta. Cold Air Boxes.

URNISHED-ROOM HOUSES—Contents are usually esirable, owing to the great inroads made by apartment els taking the better class of roomers, and the rapid de- oration of furniture from wear and tear. The furnishings he cheaper grade houses are bought from second-hand ers. Many fires are caused by smoking, carelessness i matches, swinging gas jets and cooking on gas, alcohol kerosene oil stoves. See Actors, Boarding Houses and ging Houses.

URNITURE POLISH is usually made of clay, petro- n, varnish, linseed oil, benzine, acetic acid, glacial acetic , *nitro-benzol,* lemon oil, oil of citronella and turpentine.

FURNITURE STOCK—If stock is all new and only occasional "touching up" is done, packing material kept in standard bin and safety waste can for polishing rags provided, this class appears to be acceptable to some companies, while others prefer not to write it. Cabinet making or re-upholstering may be done.

FURNITURE WAREHOUSES (for storage of household goods.) The old type is of ordinary construction, many of which are converted buildings. The main feature is the construction of the individual rooms or compartments. These are usually wooden latticework of sufficient capacity to hold a van load of furniture. The modern or fireproof structure has rooms or enclosures of fireproof material such as plaster block or terra-cotta tile. In either case, there may be repair shops for broken furniture, paint shop, stable or garage. The floors of fireproof buildings should be scuppered. Large quantities of goods are received in cases, the contents of which are unknown to the warehouseman, and may contain inflammable material. A fire which destroyed a warehouse in Brooklyn was attributed to a case of celluloid goods. The non-fireproof class has a poor fire record.

FURRING is the finish applied to a wall to prevent dampness. The usual method is to lay furring strips on wall about 16 inches O. C., then place the wood lath over the stud and then finish with plaster. This leaves a concealed space of about 3 inches. Fires getting into this space are hard to locate and put out. The up-to-date method is to place asphaltum directly on the naked brick walls and then coat with plaster, leaving no concealed space. See Finish; see Fire Stops.

FURS IN COLD STORAGE—Underwriters should be careful not to authorize "too high" a line, as considerable value may be concentrated in very small space. See Consequential Damage.

FUSE—Device for breaking an electrical circuit which may become overloaded.

FUSE (ammunition) forms the point or nose of the projectile. It is made of machined brass and aluminum parts enclosing a powder *train* and detonators. Platinum fuses

cause ignition when exposed to coal gas or alcohol vapors.

FUSE (powder) is a train of powder or a fuse which leads to a charge of powder.

FUSEL OIL (amyl alcohol)—Colorless to yellow liquid produced in the fermentation of starch and sugar, and is separated from grain alcohol. The commercial oil flashes at over 80 deg. F. The refuse from the distillation of spirits. Inflammable.

FUSIBLE LINK, as used on fire doors, etc., is made of bismuth, tin, lead and antimony. Links are ordinarily made to fuse at 165 deg. F. Even though a cord is used in place of wire to hold open a door or packing bin lid, a fusible link is needed, as it melts when temperature rises sufficiently, whereas direct heat is required to burn a cord.

FUSION POINT OF METALS—

Blast furnace slag	2500	deg. F.
Bessemer retort slag	3100	"
Brass	1600	"
Bronze	1450	"
Cast iron (pig)	2000-2400	"
Copper	3000	"
Ferro-nickel steel	2250	"
Gold	1950	"
Iron (pure)	3275	"
Iron (wrought)	3300-4000	"
Lead	630	"
Manganese steel	2300	"
Nickel	2700	"
Silver	1750	"
Soft Solder	340	"
Steel	2400-3300	"
Tin	450	"
Zinc	750	"
Glass	2000-2300	"

—N. F. P. A. (May 7, 1914). Reprinted from Western Actuarial Hazards report.

FUSTIC—A dyestuff obtained from wood or *Venetian sumac. See Dye Woods.*

G

GABIAN OIL—A very inflammable mineral naphtha.

GABLE ROOF—A sloping roof forming a vertical .ngle.

GALBANUM—A specie of gum resin.

GALENA—An ore, compound of lead and sulphur.

GALIPOT—A white resin obtained from turpentine.

GALITH—A substitute for bone, horn, ivory or celluloid; duced from milk; nearly pure casein.

GALL NUTS—Imported in wire bound boxes.

GALLIC ACID—Extracted from divi divi or nutgalls. ed in making black dyes. No fire hazard.

GALLILITH—Trade name for nitrocellulose comand.

GALVANIC DUCT—See Conduit, Rigid.

GALVANIZED IRON is iron which has been coated with c to prevent it from rusting. The iron is simply dipped zinc and is not coated by any galvanic process. Zinc, er a short exposure to air, becomes coated with a fine n of oxide which does not increase, and this preserves e zinc itself, as well as the iron beneath it. The setting ovens should be on non-combustible bases. The acids ed are hydrochloric, sulphuric and muriatic.

GALVANIZED IRON PIPE—A good insurance propition. See Iron Pipe Stock.

GALVANIZING KETTLES are brick set kettles, usually out 5 feet wide, 12 feet long and 4½ feet high. The walls e about 20 inches thick, the inner 6 inches being enclosed the four sides by a boiler iron compartment containing e coke fire, while the top is covered with metal plates. ie fires are kept going continuously (as long as six years) r it would take a *long time* to get the zinc in proper form

if it once became chilled. No woodwork should be near kettles. Good insurance risks.—(Live Articles on "Special Hazards," The Weekly Underwriter.)

GALVANIZING DRY—Metal is packed in zinc dust in sealed iron drums, placed in gas heated kilns and subjected to high temperature for about six hours, which action deposits a coat of zinc on the metal.

Drying Ovens (for galvanizing) are usually enclosed in brick walls with a boiler iron top resting on steel beams while the base is half-inch iron plates, underneath which are the various flues, with a coke fire at each end of the oven.

GALVANOPLASTIC WORK—A plaster mold is sprayed with a fusible alloy. (Materials such as lead, tin, mercury cadmium are fusible alloys.) After the coating is applied the plaster mold is removed and both the mold and the piece are given a bath to get a copper deposit, then both the mold and piece are heated (the piece is the deposit) and in this way get the fusible mold free from copper deposit by melting the same and leaving the copper intact. Then lacquered or otherwise finished. The bath referred to is the electroplating process. This requires the use of sulphate of copper, nitric and sulphuric acids. Method of wax heating important. This is used to prevent acid from eating certain parts.

GAMBIER—A vegetable tannin, extracted from the leaves of an Indian tree. Used in tanning.

GAMBOGE—A brownish gum resin.

GAMBREL ROOF—A roof with four sloping sides.

GARAGES—The principles of safety in garage construction are so well known that they need only to be touched upon very lightly. They include the imperative need of fireproof building construction, constant and effective ventilation of all floors, thorough drainage embodying well ventilated settling chambers to prevent the accumulation of volatile oils and inflammable supplies, under ground approved fuel tanks and, wherever possible, provision for dispensing fuel and oils in the open air or at least in an isolated court or passage which is subject to thorough ventilation at or about the ground line. In many localities most of these requirements are already taken care of by municipal or insurance

regulations. But where the engineer is concerned with getting a certain amount of work out of an equipment at a minimum cost, it behooves him to see that no fire loss is involved. The garage risk is twofold. It involves the possible risk arising from the storage and handling of large quantities of gasoline oil. It also involves a certain amount of risk due to the housing of a large or small number of cars, each of which may be considered in itself a risk. In an ill-ventilated garage a spark from the unprotected controller of an electric car, the arcing of a switch at a charging board, a stray spark from the ignition system of a gasoline car, a back fire or a muffler explosion may cause a fire through the ignition of stagnant gasoline vapor or gas. The following are the items usually asked for in an inspection report:

Location, Kind (of cars), Capacity of Bldg., Average Number, Construction (interior and exterior openings, floors), Exits (cars lead directly to street), Storage Above or Below Grade (percentage, arrangement), Occupancy (No. cars each floor, congested, work, etc.), Heat, In same room as Cars, Lighting (vapor proof, outside switch), Work (repair, power, carbon removed how?), Celluloid (for shields, etc), Torches (vulcanizers).

Special Hazards—Gasoline (note size tank, location, underground, vent, pump), Filling (how, where?), Cleaning Parts, Oil Separators (or allowed to run in sewers, drip pans?) Steamers (light fire under boiler in garage?), Charging Station (approved?), Oil Storage (neat's foot oil), Waste Cans (oily waste-sweepings).

Protection—Sprinklers (wet-dry), Supplies, Tanks (full), Valves, Opinion, Standpipe, Watchman and Clock, Extinguishers (sand devices), Care and Management, Exposures (serious only), Smoking. As "No Smoking" signs do not have the desired effect, i. e., to discourage and prevent smoking, the allowance given by rating bureaus for placing such signs should not be given until after two unannounced inspections have been made, the same as in clothing factories or sweat-shops. The fire record is not good. See Sewers.

GARBAGE *REDUCTION PLANT*—The garbage arrives

in scows. Grab buckets deposit it in hoppers, then it dro] to traveling conveyors on which it is carried to digeste and receiving tanks, and to the presses, which expel t] water and grease. The water and grease run off to cat basins and the solid matter (vegetable garbage) is tak from the presses and shoveled to a traveling conveyor, whi deposits it in dryers. From the dryers, the material is se to the degreasing plant (naphtha extracting process), whi extracts nearly all of the remaining grease by means percolators, which are horizontal tanks, steam heated, wi strainers. From the percolators it is run to the evaporati tanks (steam 280 deg. F.), where the vapor (naphtha) taken off by means of piping to the condensers. After co densing, the naphtha is again returned to the storage tank At this stage the mass (garbage tankage) is again convey to the dryers, where it is redried and put through the pe colating process, after which time the mass (tankage) practically free from grease. It is then deposited into stora house in dust form to be used for fertilizer. Poor fire ris See Extraction Plants.

GARBAGE TANKAGE—A product from digesters a extractors of garbage reducing plants. Subject to spon neous combustion.

GARMENT WORKERS—Many fires have been caus by smoking, untidiness, gas or electric pressing irons a individual motors. Considered an unprofitable class. S Cutting and Work Tables; also Pressing Tables.

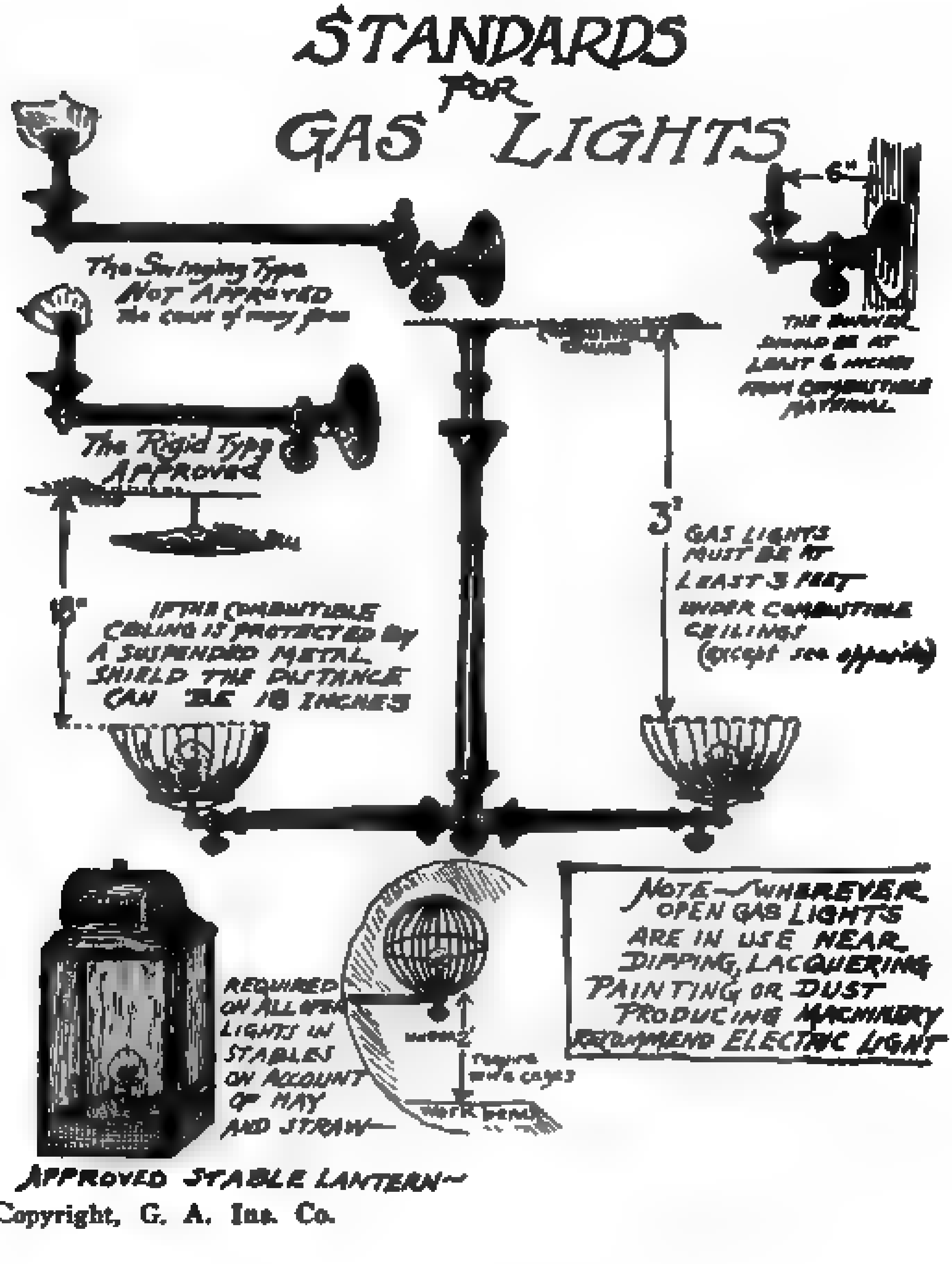
GARNER BIN—A bin for gathering and storing or simp storing grain. In grain warehouses they are called garne

GARNET—A machine which winds cotton bats on cyli ders in sheets. A type of wool card.

GAS BLACK—The soot produced from the combusti of hydrocarbon fuel or illuminating gas. It is also ma from natural gas burned under revolving cylinders, t deposited soot being removed by scraping. It is nearly pu carbon.

GAS BRACKETS should be 3 feet below any combustib or open ceiling. If shielded with suspended metal shie *they may be 18 inches distant.* No gas bracket should

nearer than 5 inches measured from the burner to the woodwork or other combustible material. No swinging or folding gas brackets should be allowed against any combustible



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partitions; same must be protected by wire cages and metal placed on walls where brackets swing. If gas brackets over sewing *machines are nearer* than 2 feet they must have wire

cages. No rubber hose is permitted to be attached to any gas jet.

GAS CROWN—Gas burner with jets of circular, slitted or perforated types.

GAS CYLINDERS—See Compressed Gas Cylinders.

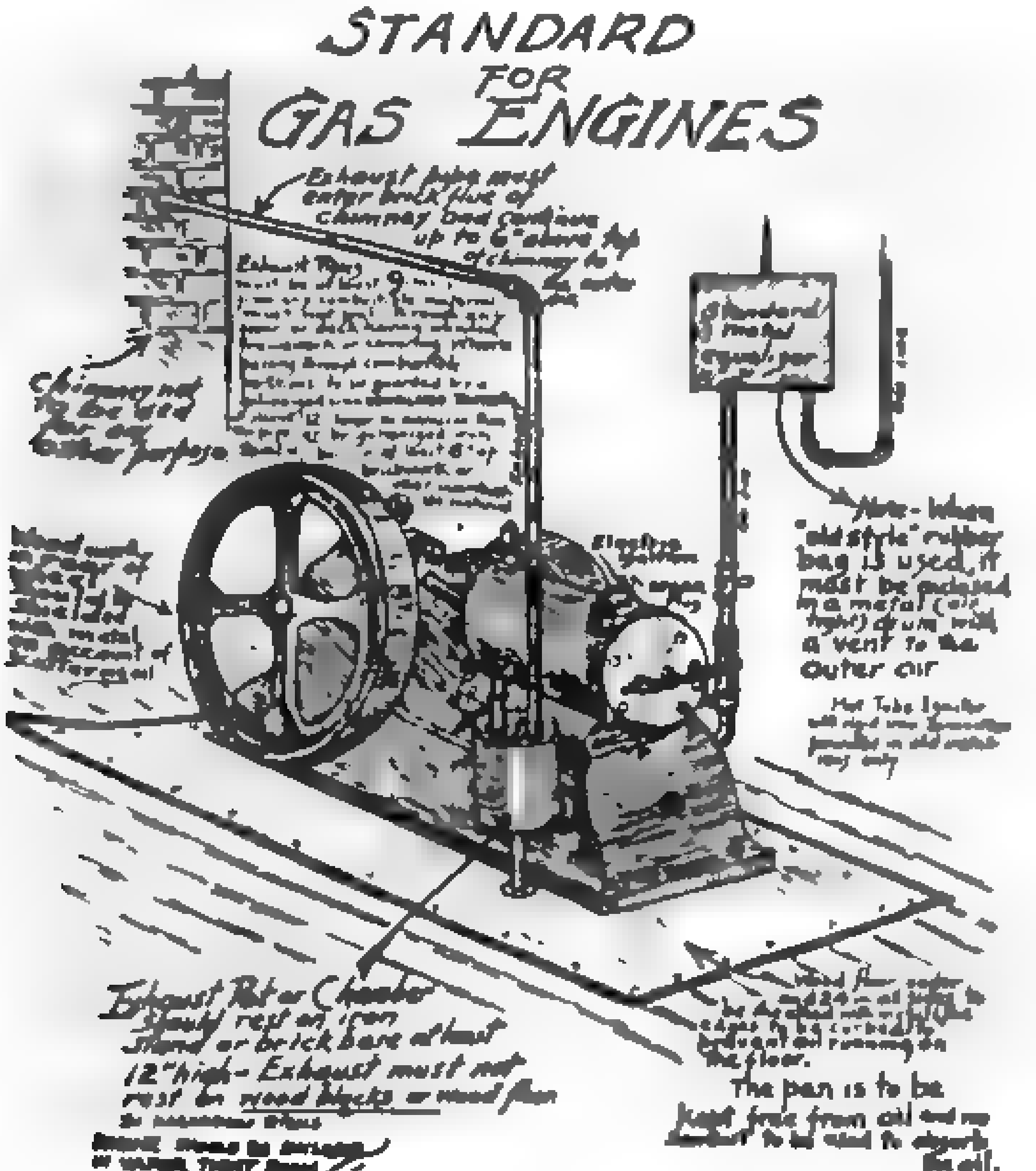
GAS DISTRIBUTING PLANTS—The gas is made elsewhere and comes through pipe lines to gas holders and is then distributed to various sections of the city under pressure. Many buildings comprise one of these plants. Power house with boilers, dynamos, generators, exhauster house with pumps, water cooling tower, condensers, carpenter shop, oil storage house, lamp storage shed, battery recharging and repairing, machine shop, meter repair shop, linemen's storage and supplies (including lubricating oil, conduits, cables, paint, ladders, tackle), blacksmith shop, arc lamp repairing, and paint shop. The fire record is good. See Gas Works.

GAS ENGINES—The hazards. Rubber gas bags are dangerous because escaping gas, due to accident or leak, may cause an explosion or fire. When used they should be 3 feet in a lateral direction from ignition chamber. Exhaust chambers or pots become very hot. Frequently they set on wood to reduce vibration incident to the operation of the engine, and for support. No wood should be allowed. The chamber or pot should be raised at least six inches above the floor or set on incombustible base. The exhaust pipe should be nine inches from all woodwork and enter a proper flue, extending at least six inches above the flue or chimney. Floors under and 24 inches outside of engine should be metal clad with flanged edges. Woodwork back of engine should be sheathed with metal as the wheel throws considerable oil. See illustration, page 307.

GAS EQUALIZERS—Galvanized iron gas equalizers are now being used in connection with gas engines in place of the rubber bags. They insure a steady and uniform gas pressure to the engine and are practically indestructible. The old style rubber gas bag is the cause of many fires.

GAS FIRES AND VAPOR FIRES can best be fought by closing all doors or other means of ventilation (thereby *excluding the air)*, and then turning on steam.

GAS FIXTURES AND GLOBES—Stocks usually is kept in basements. Stock is crated or in barrels packed with straw or salt hay. Hazards are overcrowded stock, unsafe



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gas brackets (without wire cages), and untidy premises due to packing material. See Chandelier Manufacturing.

GAS HOLDERS—Large steel tanks, usually located near gas works. Used *for storing* the gas after it is manufactured.

These holders are really reservoirs from which gas is constantly being taken and constantly replenished, as a gas plant never ceases manufacturing its product.

Gas Holders (gasometers), holding millions of cubic feet of gas, are a menace to surrounding buildings in case of destruction by wind storms or other agencies.

GAS LIGHTS—Inverted gas light mantles have caused many fires by reason of red hot carbon dropping on combustible material. A wire mesh should be placed under the burners or an enclosed globe should be used. **Gas Lights** which are two feet or less above sewing tables should be caged. See Cluster Gas Lamps.

GAS MANTLES—See Incandescent Gas Mantles.

GAS MASKS—The army gas mask never should be used in mines, because of the uncertainty there is of the kinds and amounts of gases in the atmosphere and liability of insufficient oxygen to support life.

The army gas mask consists of a face piece of rubber and cloth fabric, containing eye pieces and connected by means of a flexible rubber tube to a canister containing charcoal and soda lime for filtering out the poisonous gas from the inhaled air.

It does not afford universal protection against all gases, nor can it ever be used safely in low oxygen atmospheres. The standard army gas mask will furnish protection against percentages not exceeding 2 per cent of the following gases in air: Sulphur dioxide, hydrogen sulphide, chlorine, carbon bisulphide, nitrogen peroxide, aniline vapor, benzyl bromide, benzyl chloride, chloracetone chlorpicrin, hydrogen chloride, phosgene, sulphur chlorides, xylyl bromide, stannic chloride, titanium tetrachloride and silicon tetrachloride.

It will be seen from the above that the field of usefulness of the army mask is confined to certain of the chemical industries, around smelters and roasters where sulphur fumes are given off, and in the industries using chlorine and bleaching powder. The army canister also contains cotton filter pads which remove irritating and poisonous dusts, which increases its usefulness around smelters, where sulphur and *arsenic fumes* must be removed.

The army mask furnishes no protection whatever against carbon monoxide. This is the poisonous constituent of blast furnace, producer and illuminating gases and of mine gases after fires and explosions in coal mines. Carbon monoxide is also likely to be present in ordinary fire-fighting conditions met by fire departments. Moreover, in all of these cases there is likely to be a deficiency of oxygen. Therefore, for adequate protection against these conditions the oxygen breathing apparatus must be resorted to.

The Bureau of Mines is working on a carbon monoxide mask and hopes to develop one that may be used in the future for low concentrations of this gas, but such a mask is not now available.

Ammonia is another gas that will penetrate the standard army canister. However, a special chemical may be placed in the army canister which will adapt it for use around refrigerating plants.

The self-contained oxygen breathing apparatus can never be displaced by the gas mask for use in atmospheres deficient in oxygen. Such atmospheres are encountered in mine rescue work, in gas mains, blast furnace stoves, gasoline tanks, etc. Aside from the lack of oxygen, carbon monoxide is also present, for protection against which the army mask is useless.

The oxygen breathing apparatus must also be used instead of the army gas mask wherever there are large quantities of irrespirable or poisonous gases, as, for example, in entering a gasoline tank containing some residual liquid, or similar tanks, towers, and other closed spaces. The concentration of vapors produced by volatile liquids in closed containers is too high to be entirely removed by gas mask absorbents. The only recourse in such cases is a self-contained appliance in which the wearer does not breathe any of the irrespirable atmosphere.

GAS METERS—Fires have melted off the connecting pipe and caused a jet of burning gas to be projected into the room, setting fire to surrounding woodwork. An outside shut-off valve is recommended for business buildings. Leaky meters are responsible for numerous fires. Meters should

not be placed near gas jets. Looking for leaks in meters with a candle has caused many explosions. See Gas Safety Valves.

GAS OIL—A residue from the process of making gas. Flash point over 100 deg. F. Not volatile.

GASOILA VARNISH—A non-setting cement, essentially a mixture of denatured alcohol, gums and mineral pigment. Used to render joints tight against leakage.

GAS PIPES—Fires have been caused by leaky service pipes which have become so corroded that scales could be picked off with the fingers. Holes appear in the pipe and quantities of gas fill the premises, and if an open light is near, an explosion is apt to follow.

GAS PRESSING IRONS left with gas burning cause fires by burning wood tables, unless the pressing irons are on iron stands three inches high. See Pressing Tables.

GAS PRODUCER PLANTS—See Producer Gas Plants.

GAS PURIFYING WASTE—A fertilizer ingredient. See Iron Mass.

GAS RANGES—Vents from gas ranges should be of four-inch tile, extending through roof to the outer air. Usually they are of galvanized iron and set in between studs of frame walls and terminate in attics. It takes but a short time for the inside of this flue or vent to become heavily coated with grease. Should a pan of fat boil over, fire would ensue and pour out into the attic. See Ranges.

GAS SAFETY VALVE—A safety device to prevent the escape of gas from meters during fires. The danger of gas escaping from meters and supplying fuel to a fire and endangering lives of firemen is too apparent to need comment. The gas-valve safety device for preventing the escape of gas consists of a valve plug of any size desired with a hard steel ball soldered into hollow of plug with solder that will melt at 120 deg. F. No special fittings are required, an ordinary gas tee being used in place of elbow over the meter.

The valve will automatically shut off the gas in case fire burns off the lead meter connections or melts the soldered joints on the meter itself. When the solder melts, the ball

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ps into the mouth of the pipe and the gas pressure is on of the ball and not against it. The nipple or pipe in bottom of tee should be reamed just a little to make it fectly round as seat for the ball. This device was inted by John P. Doyle, a fireman.

GAS STOVES should be placed on iron stands and b connected with rigid iron piping. Rubber tubing should neve be used. Stoves must be six inches from combustible pa titions and shielded to 12 inches above the stove. See Ba fle Plate.

GAS TAR—A thick black liquid which accumulates at th bottom of the tar well in gas works.

GAS TUBING MANUFACTURING—Raw stock is wir cotton and silk yarn, glycerine, glue, litharge, venetian re metal parts, rubber tips. Hazards are steam heated kettle for glycerine, glue dipping mixture, wire drawing and spin ning.

GAS WELL—How Mr. Guerin, of the New York Fire De partment, extinguished a fire in a burning gas well. Pu men behind shields, push the shields to within ten or fifteen feet of the well, raise the pressure in the two seven-eighths of an inch nozzle to forty or fifty pounds and have the streams played on the base of the well casing so that they converged from an angle of 90 degrees.

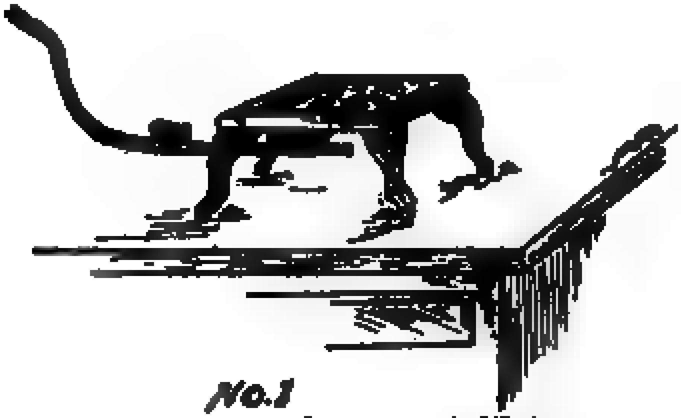
This was done. Then he had the streams slowly raised up to and through the column of gas until they reached the base of the glare. At this juncture the men who were handling the hose were ordered to squeeze their thumbs against the stream at the nozzles so that the water spread like a fan. They followed instructions.

Striking the flame where it merged with the column of gas, the water became steam, the roar of which exceeded that of the gas itself. The fire went out like a snuffed candle. The steam had simply cut off the flame from the gas.

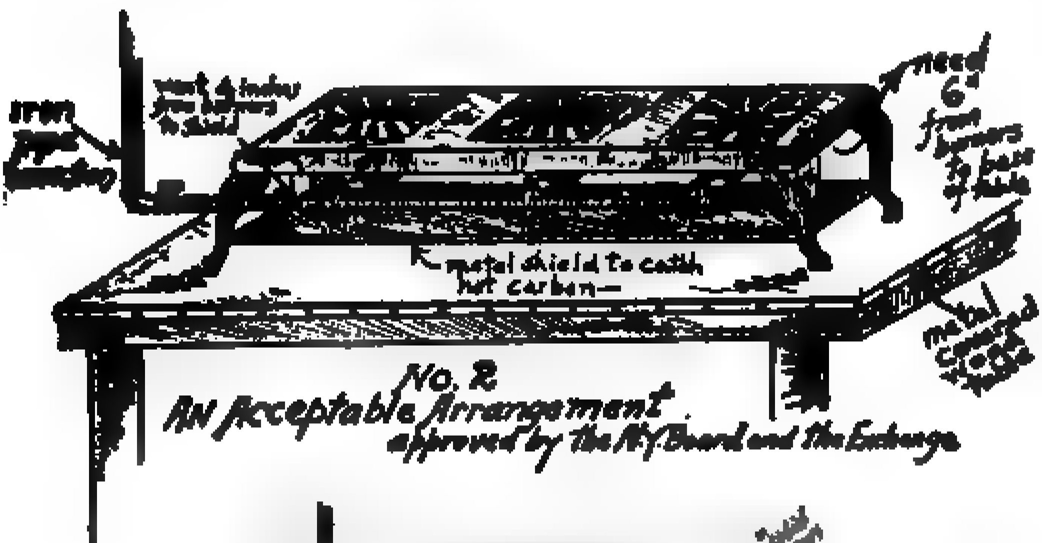
GAS WORKS—Pentone used for standardizing light instead of candles is a hydro-carbon, very volatile and inflammable. In the reviving room, chips, sawdust and iron filings that are being revived should not be spread more than 12 inches deep, because the mixture may spontane and set fire to woodwork. See Gas Distributing Plants.

GASES—Such as carbon dioxide, sulphur dioxide and ammonia can be used to advantage in extinguishing fires in confined spaces where the introduction of steam or water *might combine* with certain chemicals (such as fine metals)

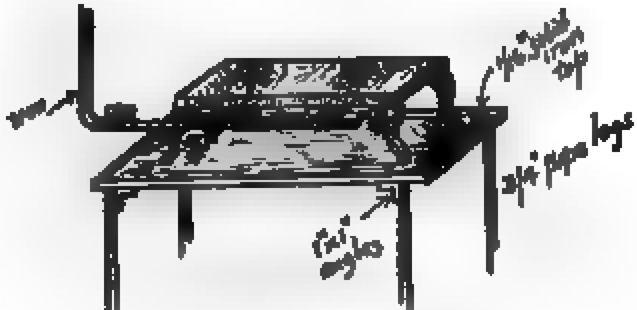
STANDARDS FOR LOW GAS STOVES



No. 1
AN UNSAFE ARRANGEMENT
NOTE— THE RUBBER TUBE and the wood bench.



No. 2
An Acceptable Arrangement
approved by the N.Y. Board and the Exchange



No. 3
An Ideal Arrangement (all iron construction)

and decompose the steam or water into its elements (hydrogen and oxygen) which reaction would increase the combustion.

GASKET—Rope, yarn or hemp is used for stuffing the joints of water pipes, and rubber bands are used for making connections water tight.

GASOLINE—Flash point 84 to 88 deg. F. Ordinary gasoline boils at 105-113 deg. F. Its vapor is power producing; when pure will not explode, but when mixed with from 2 to 6 parts of air becomes explosive in the presence of an open light or flame. When stored above ground it is constantly vaporizing due to the changing temperatures of the atmosphere. Should be stored underground in approved tanks where the temperature remains nearly stationary. When stored in this manner, it will not explode. It is often used for cleaning automobile parts by means of a brush. When used in this manner around the engine, a spark from the motor is apt to explode the accumulated vapors, enveloping the car in flames. Cleaning chamois skin gloves with gasoline by rubbing them, or cleaning silk in the same way, or filtering gasoline through a chamois cloth when filling an automobile tank, generates static electricity which will ignite the vapor.

Gasoline vapor is about three times as heavy as air, and therefore the greater portion will be found near the floor, and travel to an open flame, flash back to the container, and cause an explosion. One pint of gasoline will make 200 cubic feet of air explosive.

The following article shows the necessity of removing open lights: The Railway Fire Protection Association is now issuing a news letter to its members somewhat after the plan of the National Fire Protection Association News Letter. A recent issue sent out last month reports a fire of unusual interest. A tank car loaded with gasoline was discovered leaking when the car was some distance from the terminal. Arrangements were made by the conductor to have men on hand at the terminal to make repairs. All employees were warned of the danger and lamps were kept away from the vicinity of the leaking car while a foreman

t under to inspect the leak, working in the light of two ctor lamps on each side and at safe distance from the A lamp placed on the ground, four car lengths from leaking tank, by a yard clerk, sent to secure information, ted the vapor from the gasoline. The flames traveled to enveloped the tank instantly. The burning car was ed out of town as quickly as possible to avoid igniting ounding property. Some cars on adjacent tracks, to- er with motor car house and two other tank cars con- ing gasoline caught fire and were badly damaged.—Fire ection.

iles for storage tanks are as follows: Storage tank shall onstructed of steel at least one-quarter of an inch thick; l have a capacity of not more than two hundred and nty-five gallons, and shall, under test, stand a hydrostatic sure of at least one hundred pounds to the square inch. ink should be coated on the outside with tar or other resisting material, shall rest upon a solid foundation, shall be embedded in and surrounded by at least twelve es of Portland cement concrete, composed of two parts ement, three parts of sand and five parts of stone.

o storage tank shall be placed under the sidewalk nor in t of the building line.

orage tank shall be equipped with a filling pipe, a draw- off pipe and a vent pipe; provided, however, that no stor- tank installed as part of a hydraulic or pressure stor- system shall be required to have a vent pipe. All pipes l be of galvanized wrought iron and shall have malleable fittings. All screw joints shall be made with litharge glycerine.

he filling pipe shall be at least two inches in diameter, shall be laid at a descending grade from the sidewalk ont of the garage to the tank.

he intake of the filling pipe shall be located in a heavy al box, which shall be sunk flush with the sidewalk at the level and fitted with a heavy metal cover, which shall cept locked when not in use.

he filling pipe shall be closed at the intake by a cock or e fitted with a *coupling for* attaching to the hose of a

barrel wagon, and with a screw cap to close the opening when not in use.

Each filling pipe shall be provided with a screen made of two thicknesses of 20-mesh brass wire gauze, placed immediately below the filling cock or valve.

The vent pipe shall be at least one inch in diameter, an shall run from the tank to the outer air at least ten fee above the roof of the garage, and at least ten feet from th nearest wall of any other building, and shall be well brace in position.

The vent pipe shall be capped with a double goosenecl hood or cowl, and provided with a screen made of two thick nesses of 20-mesh brass wire gauze, placed just below th gooseneck or cowl.

Regulations of the Municipal Explosives Commission c the City of New York. See Petroleum, Benzine, also Liq uid Tank.

GASOLINE ENGINE fires occur frequently from exhaus pipes and from "back-fires." The small engine generally ha its gasoline supply in the base, and very often the union of the pump connections become leaky, and gasoline drip from them. If possible, when inspecting a risk having gasoline engine, the machine should be seen in operatio The main cause of trouble is the exhaust. Carbon ver quickly collects in the muffler and exhaust pipe, and is likel to give trouble if the exhaust pot is confined or near in flammable material. The engines burning fuel oil or dis tillate should be treated same as gasoline engines. In prac tice, the exhaust pipe from big engines is run to a concret muffler, usually built underground outside of building wit wooden tops. Sometimes these concrete pits burst open c the tops burn off. This is a severe hazard to buildings c frame construction or where any combustible material is ac jacent to the muffler.

GASOLINE EXPLOSION DANGER—See Static Elec tricity.

GASOLINE SPRAY FOR CLEANING AUTOS—A proc ess employed for cleaning oily automobile machinery with *out dismantling*. To meet this demand a gasoline sprayin

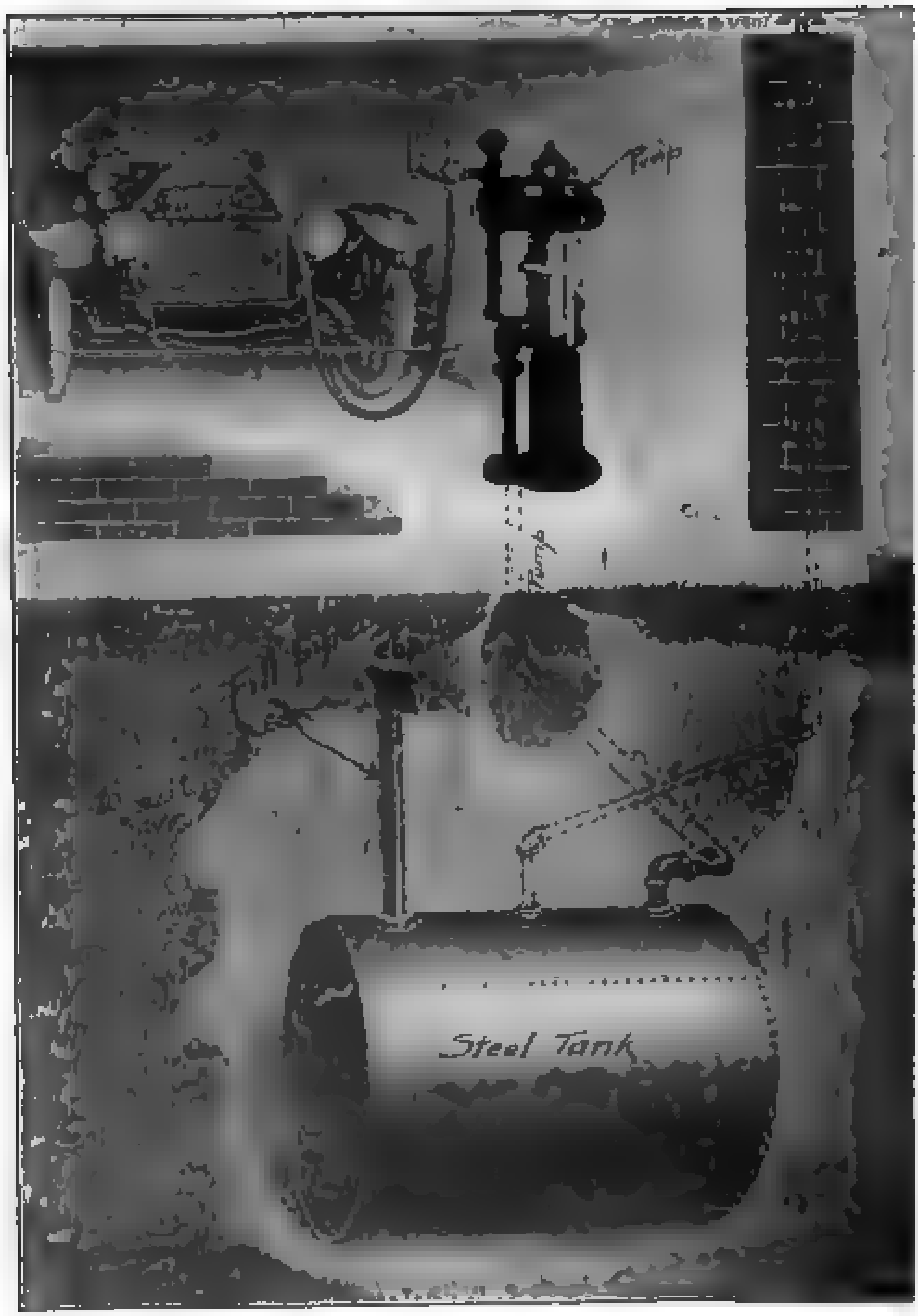
machine has been placed on the market. This machine is made of galvanized iron and resembles a 2½-gallon chemical extinguisher in appearance. It is provided with about 5 feet of ¼-inch rubber hose, a ⅛-inch nozzle, a pressure gauge and an air pump fastened to the tank. For cleaning purposes about 2 gallons of gasoline is placed in the tank and then an air pressure from 50 to 150 pounds is pumped up. To clean the automobile parts, from one to two gallons of gasoline under pressure is sprayed on the machine parts. It is understood that, after the car has been sprayed, the gasoline is allowed to vaporize and the vapor to blow away before the machine is started. Notwithstanding this supposed method of procedure several fires have occurred due to premature starting of the automobile. At some garages this is done inside of the buildings, and at others it is done in the street. An extremely hazardous process.

GASOLINE STORAGE TANKS (One Type to Prevent the Accumulation of Vapors)—Water is poured in tank forcing the gasoline to the top. The water is drained off to admit of more gasoline. Tanks are also equipped with froth or foam extinguishing apparatus, consisting of a glass bottle containing acid which is broken by a hammer when the fusible links melt, letting the acid mix with chemicals such as bicarbonate of soda and soap bark, which, under pressure, forces the resulting foam or froth on the surface of the burning liquid. Gasoline is also stored under gas, such as nitrogen or carbon dioxide under pressure. See Oil Tank Fires.

GASOLINE STOVES—Considered more dangerous than kerosene stoves. The storage and handling of the supply is important. Leaky stoves are dangerous.

GASOLINE TORCHES—Are used by plumbers and painters. Should be kept and filled outside of buildings when not actually in use. Fires have been caused by careless workmen leaving them unattended when lighted, thereby setting fire to combustible or inflammable material. Nearly all rating bureaus charge for the presence of these torches.

GASSING—*Passing material* through a gas flame or over



"Bowser" Gasoline System

rows of Bunsen burners in order to remove the down or fuzz.

GATE VALVE—The valve used on sprinkler equipments to control the water supply. They should always be sealed open. The latest type, O. S. & Y. (outside screw and yoke), enables the inspector to see at a glance if valve is open. The old style "target" valve depending on a plate marked "open" or "shut" is not looked upon with favor by inspection departments. Emergency gate valve at base of tank should not be sealed. This valve is used to drain the tank in case of accident. See Valves; also Sprinkler Equipments. See illustration, page 640.

GAY-LUSSAC TOWER—A tower used in the chamber process in the manufacture of sulphuric acid. The object of the tower is to catch the oxides of nitrogen which are necessary in the process and return them to the lead chambers where they may be used over again. This is accomplished by feeding sulphuric acid into the top and allowing it to trickle down over the tile plates where it readily combines with the oxides of nitrogen.

GEARING—A train of cog-wheels.

GELATINE—A substance obtained from one of the boilings in the manufacture of glue.

GELATINE CAPSULES FOR MEDICINE—Gelatine is boiled in kettles, usually Mott kettles (by direct heat), to a thick mass, molded into capsule form by hydraulic presses, then dried in dry rooms. Oily floors are frequently found.

GENERAL COVER CONTRACT—Usually issued to cover insurance within wide limits, but is unlike a floater in that the locations and values must be given in detail.

GENTS' FURNISHING Stocks, if damaged by water, have a fair salvage as they can, in most cases, be relaundered and pressed and sold at auction sales.

GEORGIA PINE TURPENTINE—See Turpentine Spirits.

GERMAN SILVER—An alloy of copper, zinc and nickel. It does not contain sterling silver.

GILSONITE—A high-grade asphaltum, mined in the Western States. It is similar to a raw rubber. Melts at 300

to 350 deg. F. Used in making cable insulation and in tl manufacture of varnish. Is useless if water comes in co tact with it before being compounded. Can be stored stipulated listed storage stores. Gilsonite dust was tl cause of a serious explosion in the mines of Utah.

GIN—A machine for separating cotton from its seeds. S Cotton Gins.

GIN—Flashes at about 90 deg. F. It is made by distilli the fermented spirits from grain, such as rye, barley a corn, then adding such substances as coriander seec angelica root and juniper berries.

GINGELI—A seed, similar to linseed, used in manufa turing oil; said to be subject to spontaneous combustio See Teel Oil.

GINGER GRASS OIL—See Grass Oil.

GINSENG ROOT—A yellowish root, imported main from China. Used extensively by the Chinese for medicin purposes. Susceptible to water and smoke damage.

GIRDER—A timber larger than a common beam and which the floor beams rest.

GLASS DEALERS—Have stock of ordinary sheet glas art glass, wired glass, and plate glass. Turpentine is use for cleaning old glass brought in from jobs. There is li tle salvage in large sheets of glass, as heat and cold wat applied will crack them. **Glass or China** is usually pack in barrels or boxes with plenty of straw or salt hay. case of fire, the place might resemble the after effect of "bull in a china shop." See Glass and Mirror Works.

GLASS EYES—Are made from pieces of colored enameled glass most of which are imported. Work consi of working the glass by means of gas blow pipes.

GLASS-GALL—See Sandiver.

GLASS SLATE—A piece of glass used like a slate, roof where light is required on floor below.

GLASS WORKS—Glass is composed of silica and alk The principal ingredients are sand, lime, soda ash, pot cullet, charcoal, oxide of lead, kelp, saltpetre, and col The process is as follows: Materials are mixed togethe *form a "batch,"* which is placed in a fire clay pot, inserte

ck-enclosed furnace and heated by soft coal. When atch has cooled to a temperature of about 1,900 degrees eady to be "gathered." This is accomplished by means iron blow pipe which is inserted into the fire clay pot, iolten glass clinging to the end of the pipe resembling . The glass blower then blows through the pipe which s the glass ball, soap bubble fashion. The glass design n placed in a water jacketed mold, after which it goes rick set tempering oven or "lehr" in order to give the the proper temper. Fair insurance risks if hazards are rly taken care of. See Annealing Furnaces.

ting Furnaces—Called "pot" furnaces when used by manufacturers and are generally circular in form an inside lining bench and crown of fire clay blocks brick and an outside enclosure tapering above rown forming a chimney stack. The base is usually about 10 feet thick with brick arched cave or tunnel. coal is used for heat. There are a number of openin these furnaces which receive the crucible or pot contains the "batch" of glass ingredients. Aside from tting, the only hazard of any importance is the nearof woodwork which should be kept at least 18 inches the furnace.—(The Weekly Underwriter.)

ASS WORKS—(Plate and Window)—Raw stock used production of plate glass presents no inherent fire d, as it is principally composed of washed and dried lime, soda ash (salt-cake), cullet (broken glass and from melting pots), and a portion of arsenic (cobalt) lor.

fire hazard incident to the preparation of the materials nts a mild condition, as the material is not combustible he only source of heat lies in friction of bearings in ng and mixing devices, which being of iron would no trouble if properly freed from contact with wood ier combustibles.

te Glass is subject to considerable damage from and water in case of fire, it appearing to take indelible when packed in straw and then wetted and smoked, soon removed and washed off. These stains probably

arise from the deposition of the coloring matter in th rotting straw, aided by the corrosive action of the creosot deposit from smoke, and if the plates are not properly handled within two or three weeks of the time of the damage, a large percentage of loss is liable to ensue. This condition is likewise true in relation to ordinary window glass, perhaps accentuated owing to the larger amount of straw or hay in the packing and the more open nature of the package.

Glass (Colored)

Amber is produced by the addition of carbonaceous matter, i.e., grain, coke, coal, or other organic matter. It is also produced by sulphur and certain sulphites.

Black is produced by an excess of coloring matter such as manganese, cobalt, or iron.

Blue can be produced by cobalt or copper.

Canary is produced by uranium.

Green, chromium or iron alone will produce green, though it is usually made by combining several oxides.

Purple is produced by manganese dioxide.

Red or **ruby** is produced by gold, selenium or copper. (C. C. Dominge, "Live Articles on Special Hazards," The Weekly Underwriter.)

Glass, Frosted—Made by treating the glass in a solution of hydrofluoric acid with ammonium carbonate or with a sand blast.

Glass, Leaded—The shop hazards are crimping, cutting and soldering. Gas mufflers are used for soldering irons. Glazing and painting is done in small way.

GLASS AND MIRROR WORKS—Fire which causes much smoke ruins the glass by cracking and smoking. Smoked glass, especially plate, is useless unless ground down. This process exceeds the cost of the glass. The white glass, resembling marble, is very expensive. Such glass is ruined if smoked up. The grinding stones are made of a composition, very hard, varying in thickness from one to two inches. They crack under the action of heat. Cutting stones are carborundum, which also crack under heat. Fair *fire risks.*

GLAUBER SALT—See Sulphate of Soda.

GLAZED TERRA COTTA (for exterior facings and ornamentations) is dense and very hard and has given a fairly good account of itself in serious fires, although small cracks and craying may happen. Rating bureaus usually charge for building fronts having glazed terra cotta.

GLONOINE—An explosive used chiefly in blasting.

GLORY HOLE FURNACES (in glass factories) are small brick-enclosed circular furnaces using fuel-oil heat. These small furnaces heat the glassware so as to trim the edges. Setting and clearance should be carefully inspected. **Glory Holes**—Small holes in a furnace through which the interior is viewed. See Glass Works.

GLOST KILNS—Glazing ovens used in potteries.

GLOVES—Cotton Gloves. Cut by hand or machine or die presses; stitched on sewing machines; pressed and formed into shape by steam-heated glove forms. Light hazard.

Men's gloves, being heavier than women's, are not so susceptible as the latter and, if slightly damaged, can still be used as work gloves, whereas women are very loath to wear gloves which are spotted or defective. **Kid Glove** stocks are very susceptible.

GLOVERS TOWER—A tower used in the manufacture of sulphuric acid. It is filled with quartz and tiles. The fumes from the combustion chambers pass through the tower acquiring its nitrogen oxide.

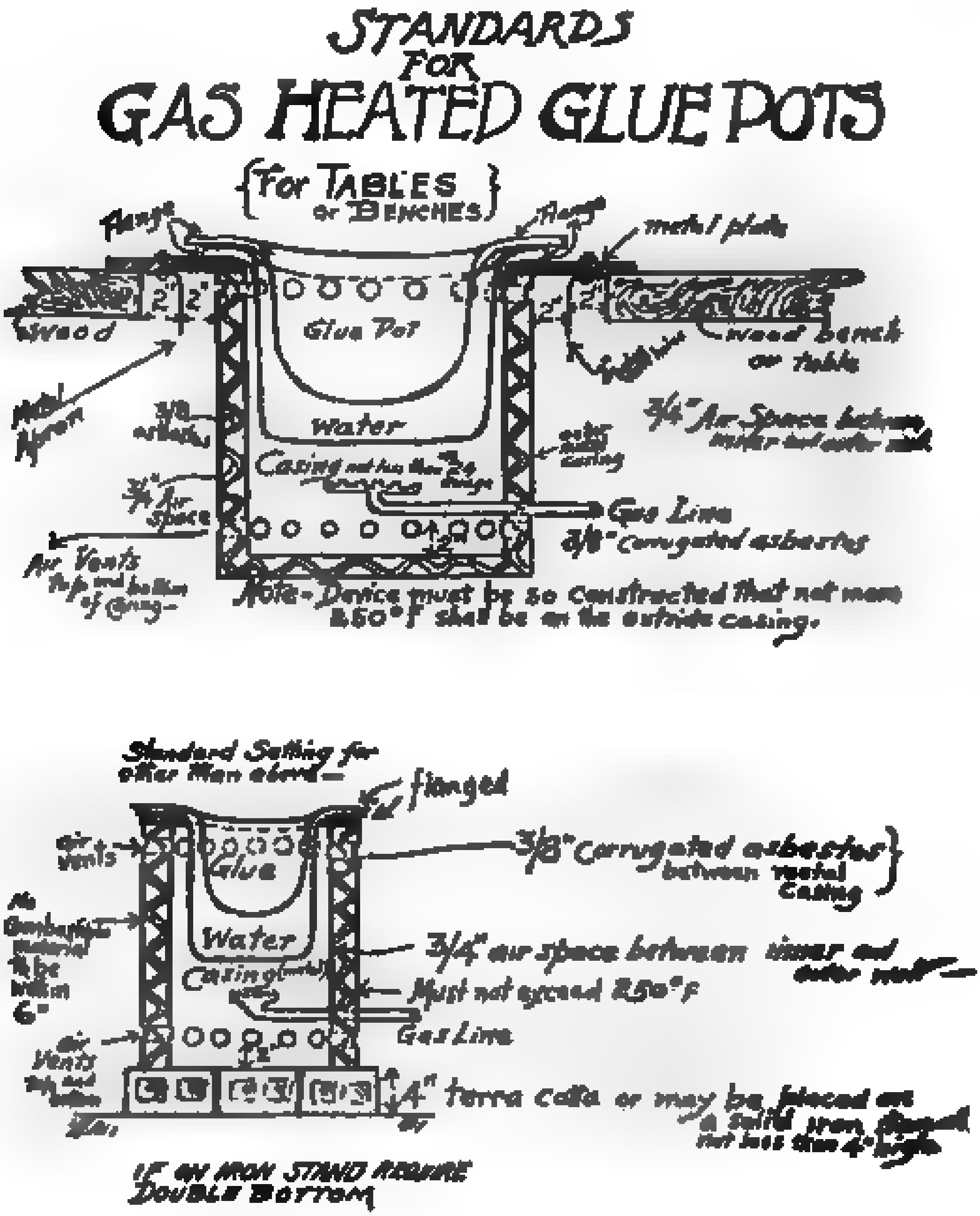
GLUCOSE occurs naturally in most fruits, honey and corn. Sometimes made from potato starch.

GLUE—Gelatine produced by boiling the parings of hoofs, and also from fish. Factory hazards of boiling and evaporating. The arrangement of drying ovens and sulphur burners is important. Usually a nuisance to neighborhood. A class avoided by most companies.

GLUE POTS—If heated by direct heat, and without water jackets, should have flanged pan protection to prevent contents, if fired, from spilling and spreading.

GLUE SIZE AND PASTE—In manufacturing, use raw gums, *Fuller's earth, sodium,* paraffine, sugar, honey, turpen-

tine, creosote, cresol, corn syrup, boric acid, starch, sago, dextrine, flour, nitric, sulphuric and acetic acids, rosin, castor oil, linseed oil, cement and peanut oil.



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GLYCERINE is formed when natural fats decompose by treatment with alkalis or superheated steam. Flash point *about 475 deg. F.*

GLYCERINE REFINERY—Inspect for stills, evaporators, filters (charged with boneblack and bone char), revivifying kilns. The following is taken from a fire report:

Underwriters have been much interested in the fire which damaged the glycerine factory of Marx & Rawolle in Irving Street, Brooklyn, which is said to have been caused by a fracture in the copper bottom of the still which allowed the steam pressure to blow out and scatter the rice coal fire all over the room, igniting the combustible wrappers around the filters. A new system of automatic sprinklers was being installed, and on two of the filters asbestos had been substituted for the combustible wrappings. The other ten filters would have been wrapped in asbestos in about a month. Part of the asbestos material for this work was damaged by the fire.

GLYCOL (or ethylene alcohol) is a colorless liquid with a sweet taste. Not inflammable.

GLYOXILINE contains gun cotton, very inflammable.

GO-DEVIL—A device to clean wax or hardened oil from the inner surface of oil pipe lines, or incrustations from water mains. There are several types. Ordinarily it is a steel shaft to which are attached blades, knives or saw-teeth to remove the sediment, and plates the size of the inner diameter of the pipe, fitted with leather washers which smooth the surface of the pipe.

GOFFERING—See Flowers and Feathers.

GOLD BEATERS—The first process is to beat the gold in a "shodder," which consists of pieces of specially prepared skin, with which the metal is interleaved. Though the hammer used is 14 pounds in weight, the elasticity of the skin causes a rebound, which considerably reduces the exertion of lifting.

The "shodder" during the beating process looks rather like a pack of cards, only a little larger, and the "cutch" into which the pieces of gold, already thinned out to several times their original size, has much the same appearance. At this stage, however, much finer skins are used—so fine that the 700 or so of which the "cutch" is composed make a thickness of less than one inch. After some hours more

of beating, the gold leaf is again cut and put between yet another book, or pack of skins, known as a "mold."

The "mold" is beaten on for about four hours with hammers of varying weights and sizes, according to the stage of the beatings. The transferring of the incredibly thin leaves of rich, yellow metal from the "mold" to the books bought by the gilders is done with a very fine pair of clips, or pincers, made of the lightest wood.

The leaf is laid on a cushion of soft leather, and then delicately cut to the size of the book with a simple-looking instrument of wood with sharpened sides, known as a "waggon." Good insurance risks.

GOLD FLAKE—See Gold Paste.

GOLD PAINT—See Bronzing Liquid.

GOLD PASTE—Sometimes called rubber substitute, but really is a low grade rubber coming from the Gold State Country in Africa. When taken from the trees, it is allowed to dry and is then put in barrels and water added to keep it in a soft state. It boils at about 120 degrees to 140 degrees, flashes at 190 degrees.

GOLD REFINERIES—Hazards consist of dryers, roasters, storage of sulphuric acid and lime, sulphur burners and storage of niter bags.

GOLDSMITHS—Hazards of melting pots, metal working, gas blow pipes, polishing.

GOLD PLATING—Solution of gold cyanide and potassium is usually used. See Electro-Plating.

GOLF BALLS—The core is gelatine or soap and water or an acid resembling sulphuric, contained in a rubber bag around which is wrapped a tight rubber strip, then follows a layer of rubber strips and an outer shell of gutta-percha and composition.

GOODS IN HANDS OF—A term signifying that goods belonging to one party are in the hands of another party, presumably to be made up, as for instance, cloth in the hands of a contract tailor to be made up into garments. Considered desirable insurance at current rates, even in sweat shops, as quite often it is found that prior to the fire most

of the goods have been returned to the owner. See Sweat-shops.

GOOSENECK—The inverted end of a cast iron or other pipe used at the end of vent pipes above the roof of garages, etc., to prevent rain from getting into the pipe.

GOULARD'S EXTRACT, or **Tribasic Acetate of Lead**, is prepared by dissolving litharge in solution of acetate of lead; it may be obtained in needlelike crystals, which have the composition.

GOVERNOR—The part of a machine which regulates the speed, usually by two balls attached to springs on a revolving axis. Increase in speed causes the balls to fly outward, which action regulates a valve, which in turn reduces the amount of power delivered to the machine.

GRADE FLOOR—Nearest floor to street. Usually determined by counting number of steps to each floor.

GRAHAMITE—An asphalt used in making cable insulation compound. Contains carbon and has caused mine fires in West Virginia and Utah.

GRAIN ALCOHOL (or Ethyl) boils at 176 deg. F.

GRAIN ELEVATORS or **Warehouses.** Grain is usually received from barges or trains, elevated to top of building and dropped into receiving bins, called "garners." Thence it is cleaned, mixed, bleached and perhaps cooked. From the steam cooker the grain is conveyed in worm conveyor to a hopper, through rollers to squeeze out water, then to grain dryer, and through an exhauster, where dust is conveyed by blower to a cyclone.

The **bins are usually** "cribs" made of planking, and extending from first to top floor. When the warehouses are built in rows they are usually connected by endless belt conveyors on which the grain travels from one building to another. Standard automatic drop doors should be at each side of openings at fire walls. Cleaners and other machinery are usually located on first floor. The "scourers" (smut removers) and mills should have magnets, as they revolve at high speed, as do the "clippers," which clip the ends of the grain. Sulphur fumes are used for bleaching.

Dryers are *invariably steam*-heated. Cleanliness about the

plant and machinery is essential. Dust in machinery and elevating machinery is more hazardous than that found under ordinary atmospheric conditions from handling of the grain. The use of open lights or of unguarded electric lights lowered into bins to ascertain the quantity of grain therein, has often caused an explosion of the dust in suspension in the bin from the open light or the breaking of the electric light bulb. All lights should have guards. Grain dust explodes from sparks in grinding or milling machines, electric sparks from motors or from static electricity generated by rapidly-moving belts and pulleys. Fires are caused by clogged elevators (sometimes called lofters) or grain accumulating around "strut-boards," also by friction gearing at machinery, journals resting on wood, cyclones, wood pulleys and sparks from motors or railroads. Dust spouts from cleaners should not exhaust on railroad side of building as sparks from locomotives may enter the spouts.

GRAIN FIRES—A great many of the disastrous field grain fires originate when threshing begins. Fires in threshers are mainly caused by static electricity in the machines. If damp and piled closely will often generate enough heat to cause combustion. Spontaneous combustion feature similar to hay.

In fighting even small fires, considerable water is usually thrown by firemen before the seat of the fire is reached. The water does considerable damage to the grain. Even smoke permeating grain will give it a peculiar odor which greatly lessens its value.

Dust on Globes Causes Fire—A new grain elevator hazard has been discovered which many feel may be responsible for a number of fires of unknown origin that have occurred in well filled elevators.

In a large elevator recently three fires started within five feet of each other, at intervals of one hour. The employee in charge was a man who had been with the company for twenty years and whose record was above reproach. There were various theories concerning the origin of the fires and it was decided to make a detailed investigation. Detectives *were employed to* come into the plant and work with the

men and a complete survey was made of the electrical equipment.

Experiments by electricians developed the fact that the fires were caused by wheat dust collecting on a 16 candle power, 55 volt, ordinary incandescent lamp. The dust ignited from the heat from the globe, fell to the floor and ignited litter lying there. Further experiments showed that the defect may be entirely corrected by the installation of double globes, or in other words, encasing an ordinary globe within a thin glass covering. This modifies sufficiently the intensity of the heat, but does not reduce the light.

The waste matter that accumulates on the floors of ele-highly inflammable nature, and although the ability of an vators storing wheat, oats, barley and other grains is of a ordinary incandescent lamp to ignite waste matter of this kind may be doubted by many, the tests conducted at this particular location proved conclusively that the hazard exists and must be reckoned with, although it can be eliminated as outlined. (Fire Prevention.)

Suggestion of Insurance Department of Washington

This hazard can be guarded against to some extent by keeping the top of the machine open, allowing the smut and dust to blow away. Have shovels and some spaded-up earth handy to the feed, as shoveling dirt into the separator will frequently extinguish the fire. Chemical extinguishers of 2 and 3 gallon capacity are most efficient.

Threshing-machine engines should be equipped with spark arresters and precautions should be taken to keep the same clean and clear from soot. When the engine is moving from one setting to another a man with a wet sack should follow fifty to one hundred yards behind the machine in order to extinguish any fire which may be started by sparks. A barrel of water with tub and wet sacks should accompany all threshing outfits.

The **ash dump** should be thoroughly covered with dirt and wet down before leaving the setting. The engineer should not be depended upon to extinguish dump fires, but the grain

growers should be on the ground and see that all fires are carefully extinguished.

Sparks from trains—If a field is exposed to railroad, hay strip should be cut about fifty feet wide, and fire guards of at least ten feet of furrows plowed between railroad track and the field. If field is exposed to country road where there is considerable dry grass or the road is strawed, it is well to plow a fire guard between the field and the road.

Old straw stacks which have been burned at the time of plowing frequently cause fires. Precaution should be taken not to set the machine or allow the new straw pile to be near the burned butt of the old straw pile.

Back fire from gas engines—A number of fires are caused by back firing of gas engines. The exhaust should be screened and kept free from dust and precaution should be taken to have a guard follow the gas engine when moving. Exhaust should be at least five feet above separator where used on combines. A chemical fire extinguisher should always accompany the engine.

Smoking—Under no circumstances allow smoking in any field at any time after grain begins to ripen.

Oily rags which are used for cleaning up around machinery should never be thrown aside or dropped in a field, as is sometimes done. Spontaneous combusion may result. All threshing machines should be equipped with metal receptacles for oily rags.

Fires in the field are very difficult of control, especially where the straw is heavy. Every precaution should be taken to eliminate the cause. A very large proportion of the fire loss can be prevented if farmers will plow at least ten feet of furrows around stacks as soon as the grain is cut, making a circle large enough to take in both the setting and separator and leaving the engine outside the furrow. By use of a harrow or other means, the stubble should be removed from the ground. It is not sufficient to plow two or three furrows that do not fully cover the stubble. It is little less than criminal to allow a fire to spread in this manner when it can be largely controlled by following these suggestions.

Fighting field fires—The most effective way is with wet

cks. Men should go out on all sides with wet sacks and at it toward the centre. A barrel or tub of water should put in a machine or wagon and immediately driven to e fire fighters so that they can keep their sacks wet at all mes.

Fires in setting—Grain sacks burn very slowly, especially hen in large piles. If work be started immediately most f the damage can be prevented. Straw should never be iled on sacks until after the engine has been moved and it is nade absolutely certain that no fire can spring up.

Combined harvesters—When grain is harvested by a combine, the sack grain should be taken care of promptly. There s a large and useless risk in leaving sacked grain scattered bout the field. Remember, it is your duty under the policy onditions to prevent and put out all fires and save grain fter the fire. Do not be misled by the impression that ou should not touch the grain until the adjuster arrives. 'ou violate the policy conditions if you do not use due dilience to take care of it.

GRAIN STORAGE TANKS can be built of terra-cotta le, circular in shape, furred on the outside with tile 2 inches thickness and 12 inches in height (the furring tile overlap e inner tile), the whole being reinforced by pairs of steel nsion bands running through the walls at frequent interils. The steel tension bands are imbedded in a cement routing and the outside furring is applied with a cement ortar. The foundation walls and base are built of concrete.

GRAIN STORAGE WAREHOUSES—Old type brick nstruction are lined with continuous planking of crib conruction forming bins. This peculiar construction, with its nveyor communications, together with the enormous ight and almost total lack of windows or fire escapes, akes this class a hard one to fight in case of fire. Fires this class usually are of a "flash" nature and sprinklers ay not prove effective. Even though heavy blank fire walls parate the various buildings, if much water is thrown on e grain the walls are apt to bulge and come down when e wet grain expands. (Lessons learned from Dow Stores re, Oct. 14, 1917.) See Cleaning Machinery.

GRANITE—Under fire will explode and fly off in fragments, or it will disintegrate into a fine sand.

GRANULATING—Forming into grains or small masses; separating molten substances by dropping or pouring into moving water.

GRAPHITE, or **Black Lead**, as it is called, is a form of carbon, used in lead pencils. The name "black lead" is misleading, for there is no lead in this substance. It is purely carbon with a very small amount of iron.

GRAPHITE (artificial)—Made from anthracite coal; can be used as a lubricant in graphite grease form.

GRASS—In large piles or stacks ferments very rapidly, the heat developed being known to entirely destroy immediate surrounding combustible material.

Before burning off brush or grass, the dry material should be raked a considerable distance away from any barn or other building so that if a high wind blows up, the fire can be stopped before it does any real damage. During a dry spell, a lighted match or cigarette or locomotive spark may set fire to the grass. Under no circumstances should a fire be started and then left unattended. Always have a pail of water handy or a shovel to throw dirt on fire.

GRASS OIL—A fragrant, volatile oil from leaves and stems of India grass.

GRAVITY AND PRESSURE SYSTEMS for Fuel Oil—Inspectors should ascertain if gasoline or fuel oil systems is supplied by gravity or pressure. The former is not approved, because the supply is above the point of use and the supply pipes continually contain oil whether system is in operation or not. In the latter case, the system depends on a pump to bring the oil to the outlet and the supply pipe is pitched to drain back to supply tank.

GRAVITY SUPPLY of water is the best thing for fire purposes. A reservoir of good capacity or a large standpipe gives a reserve supply already stored at the higher elevation and available to meet any sudden large demand. Water thus stored is, we may say, capital on hand, giving strength to meet any emergency, whereas, the best pumping equipment must depend on the right action promptly taken when

ecial demands arise, and there must be very large reserve)acity to meet possible heavy calls which would come but 'ely. (French.)

3RAVITY TANKS—The usual requirement for sprinkler ıks (when a secondary supply) is an elevation of 20 feet ɔve roof to give about 15 lbs. pressure on top lines. If ɔrimary supply, a 50-foot elevation is desired. Ordinary ed tanks are made of 2½-inch first grade dressed lumber, steel. Round hoops are used, as flat hoops burst from ıt. Water is kept from freezing by steam coil; but at times am jets are used. Exposed piping must be packed frost-ɔof. "Tell-tales" are used to indicate height of water, al-ɔugh mercury gauges may be used. These latter are con-cted to tank riser on tank side of check valve and installed ıide of building.

GREASE—See Axle Grease.

GREASE ERADICATOR—See Eradicator.

GREASE FIRES **in hotels and restaurants** are caused by e ignition of grease which has collected in the ventilator ɔe connected with large ranges. The grease slowly con-nses on the inside of the pipe until it is thickly coated, ıen it may ignite, and because the pipe has not ample clear-ce from combustible material, start a fire. Some authori-s recommend **steam jets.** Water thrown on grease when re will scatter the fire. Sand or even sawdust is preferable.

GREEK FIRE—A colored fire mixture, classed as fire-ırks. See Explosives.

GREEN HIDES—See Hides.

GREEN HOUSES—See Hot Houses.

GREER OIL—Made from sediment of gas oil; volatile.

GRIDIRON—See Theatres.

GRILLE—See Iron Grille.

GRILLAGE—A sort of net work of timbers laid cross-g each other.

GRILLAGE FOUNDATIONS—See Floating Founda-ıns.

GRINDING—See Dust Explosions.

GRIPPING—See Flowers and Feathers.

GRISSETTES—Plain triangular pieces of plate iron riv-

eted by their vertical and horizontal legs to the sides, top and bottom of box girders for strengthening their angles.

GROCERS, RETAIL—Good insurance if well established.

GROCERS, WHOLESALE—Losses in this class are heavy and are regarded by most companies as unprofitable. There may be spice grinding, coffee roasting, bottling of salad oils, ammonia or vinegar, considerable excelsior for packing material and storage of large quantities of matches. See Canned Goods.

GROIN—An arch formed by two segmental arches or vaults intersecting each other at right angles.

GROOVED-AND-SPLINED—Planks grooved at both edges instead of being tongued and grooved. When laid, a strip, called a spline, is driven in between the planks, which takes the place of tongue.

GROUND (Made Ground)—Cinders from smelting furnaces or others which contain a large percentage of unconsumed coal should not be used for filling under buildings. The Tottenville Copper Co., Staten Island, suffered a loss of approximately $20,000 on April 14, 1910. Fire was discovered near the melting furnaces and was probably started by hot coals finding their way through a crack in the bottom of pot melting furnaces or flue and thereby coming in contact with the unconsumed coal in the cinders of which the filling under the floor of the building was composed. N. Y. Board of Underwriters.

GROUT—The mortar poured into the interstices between stones or bricks.

GUANO (manure)—If moist and piled deeply, is liable to cause spontaneous combustion. Although the hazard is very mild, inspectors should always suggest that pigeons and chickens be removed from the attics or cupolas of buildings.

GUARDS—During war times and strikes, when incendiaries are active, the question of sufficient armed guards plays even a more important part than the construction of the building and the hazards contained therein. The year 1917, with its heavy loss record, shows that many plants were not properly guarded. See War Conditions.

GUAYULE—A form of rubber.

GUESTS—See Servants.

GUMS—Nearly all kinds are imported in bags.

GUNCOTTON—Cotton soaked in nitric and sulphuric cid mixture. The stronger the nitric, the more powerful the uncotton. A weak solution produces collodion or celluloid. ee Nitro-cellulose.

GUN METAL (or Bronze)—A compound of copper and in.

GUNPOWDER—A mixture of potassium nitrate or saltetre, powdered charcoal and sulphur. The explosive quality f gunpowder is due to the fact that it will burn with great apidity without contact with air and that in burning it librates large volumes of gas.

GUNNY—A coarse, heavy fibre wtth a satiny lustre. A pecie of jute or hemp. Used principally for bagging. Empty ags which have contained oily substances or oil products hould not be stored in piles as spontaneous combustion aay result.

GUNSMITHS—Foundry hazard and extensive machine hop with plating and buffing, also wood working. Considrable oil and grease is used to prevent the guns from rustag, low grade vaseline being used extensively. When fixed mmunition is loaded, such work should be in a separate uilding. Fair insurance risks.

GUTTA-PERCHA—Gutta-percha is rubber. When in heets, steam-heated mixers and calenders are used. When nixed, beeswax is added to keep the gutta-percha from stickng to the rollers, and oxide of iron and oxide of zinc are lso added. The sheets are sprinkled with talcum powder o prevent adhering when rolled up. Hazard is mild.

GYPSUM is **sulphate of lime** found in rock formation. t is a slow conductor of heat, as it contains in its mass a nultitude of infinitely fine air cells. Gypsum manufacturers laim that three inches of gypsum properly applied to steel or ironwork will hold the temperature of the metal to about 00 deg. F. when exposed to 2,200 deg. F. for a period of our hours.

GYPSUM ARCH (Fire Test)—A 4-inch panel flat arch of gypsum and shavings reinforced with Clinton Wire Cloth,

two inches cinder concrete fill on top and soffit of arch covered with 1½ inches of plaster, 1 part cement and 3 parts composition plaster. Span of arch 5 feet 3 inches to center of I beams. Furnace of 12-inch concrete, interior about 9 feet above grating on which the fire was placed. Heat averaged 1,700 degrees for 4 hours. The gypsum arch surprised those in charge with its unexpected strength. The arch had been in place about two weeks. After the test the arch was intact except that wire mesh reinforcement was exposed where water from hose stream washed the plaster off, about 3 inches remaining showed result of calcination; the lower flanges of I beams were exposed. The sawdust appearing in arch is natural in color, showing heat did not penetrate through arch further than one-half inch. No load test was applied.

Water Application—At intervals of 5 minutes the following was applied: 2½-inch hose with 1⅛-inch nozzle, 100 pounds pressure at hydrant. First, stream of one minute duration at each of two doors to quench fires, one minute streams on arch, outside flushed for one minute, hose applied three times to interior of furnace to cool and wash down.

GYPSUM PLASTER MILLS—Reduce gypsum to the finest possible powder or flour before passing it to the cookers or calcining kettles and then to apply only such degree of heat as will serve to carry off such proportion of its contained moisture as will prevent the voluntary setting or hardening of the finished material when exposed to the atmosphere. Inspect carefully before binding lines.

H

AIR—Human hair stocks are not considered desirable, g to susceptibility of stock.

AIR BRISTLES—See Bristles.

AIR CURLERS are made of piece or scrap leather, cut sewed with a cotton filling through which runs a wire. ards are storage and sorting of scrap leather into which iderable quantities of rubbish find their way; sewing ma- es, storage and use of cotton batting or tow. Usually dy appearance.

AIR-DRESSERS—Use alcohol for massage purposes, in lamps for curling irons, electric curling irons and dryers, also gas-heated hair dryers. Some use benzine cleaning hair goods and also make cosmetics on the nises. Fair risks.

AIR FABRIC as used for nets or braid. The hair is ced to a paste by a solvent, run through an artificial spinner and drawn out in threads. Can be braided or en like horse hair.

AIR GOODS—Manufacturing—The hair is washed in water with or without disinfectant, bleached (usually peroxide of hydrogen), dried in dry room, curled on s, hand combed, or dyed. Use aniline dyes, muriatic sulphuric acids. Highly susceptible. See Dry Rooms, Bleaching.

AIR NETS are made by hand from Chinamen's queues om combings of women's hair.

AIR ORNAMENTS are usually made of celluloid, ivory, tion ivory, vegetable ivory or bone. Involves hazards elluloid working on power machinery. See Celluloid.

ALIDES are a group of elements including fluorine, nine, chlorine, and iodine.

ALLS—Buildings used for halls and lodge rooms are

usually of large, open area; either frame or ordinary brick construction with unprotected floor openings. May have miscellaneous stores on ground floor. The hall proper usually has a complete stage equipment; the stage constructed of wood or other light material; makeshift dressing rooms and an abundance of old properties and scenery which accumulate and are rarely ever removed. The dance floor is highly polished, and care should be exercised in storing of oil and floor mops. Gangsters frequent the poorer class halls. Many fires are caused by smoking. Usually someone during the evening drops a lighted cigarette or a cigar butt in some obscure corner, which smolders and during the early morning hours finally breaks into flame. Fires once started in this class are hard to extinguish. Poor fire record.

HALOXYLINE—A form of gunpowder.

HALVING—To notch together two timbers which cross each other so deeply that the joint thickness shall only equal that of one whole timber.

HANDKERCHIEFS—Fancy handkerchiefs are mounted on colored pasteboard which, when wet, may stain and thereby reduce the value of the goods. The manufacturing consists of cutting, sewing, hemstitching and ironing. Classed as white goods manufacturing. The nature of the business requires cleanliness.

HANGARS—Usually high one-story light frame structures used for housing airplanes. Mechanics and others frequently smoke here and throw oily waste about. Gasoline in cans is sometimes found. A poor fire record class as they are nearly always located in sparsely settled places without fire protection. Interior protection is essential. (S. T. Skirrow.)

HANGERS—Fixtures projecting below a ceiling to support the journals of long lines of shafting, or piping.

HARD COAL is almost wholly composed of carbon.

HARDENING AND TEMPERING—Known as Heat Treatment Process in machine shops; consists of hardening and tempering tool steel. The steel is first placed in gas-heated hardening ovens until a certain temperature is reached and then plunged into an oil trough with agitator. The oil used is principally fish oil, flashing at about 550 deg. F. Care

should be taken to see that the furnace is properly set. (H. G. Boyle.)

HARDWARE—Heavy hardware stocks are mostly unpolished wares and are preferable to light hardware, which is polished and therefore more susceptible to rust from moisture.

HARD WOODS—See Lumber.

HARNESS-MAKERS—Work consists of stuffing collars, sewing and oiling harness. Tow, straw, hair, or hay may be used as stuffing material. The fire record is good if well established.

HARNESS OIL is mainly neatsfoot oil.

HARTIN—A resin obtained from lignite.

HARTITE—A fossil resin found in coal beds.

HARTSHORN—See Ammonia.

HATCHWAY—A horizontal opening in a floor. Should be automatically trapped in order to prevent fire from gaining access to other floors. See Shafts.

HAT CLEANERS—See Bootblacks.

HATS (FELT)—Busiest season is from August to November. The larger factories start before the smaller ones. The hats are made of wool or fur felt and are shaped from the felt in gas or steam-heated presses over plaster moulds, then pured (putting on the nap) by brushing the felt so that the hair lays in one direction and greasing with a cloth pad which is applied until a gloss is obtained. The brim is shaped by a gas-heated machine. The edges are singed over a naked gas flame or by the flame from a pot of burning crude oil. If the latter, the oil pot should be in a metal enclosed box with vent pipe. Small gas burners are used to heat the blocking irons. The lining is then put in. Heating of lauring stoves important, gas being principally used but sometimes kerosene oil. **Buckram frames** for hats are sized with shellac, varnished and glued. Fair risks if hazards properly safeguarded. See Buckram, also Furs (Hatters').

HAT STOCKS are very susceptible. **Derby** and other stiff hats are practically ruined as far as sale is concerned if damaged by water or smoke. **Soft hats** are not so easily damaged. **Straw hats** are usually a total loss.

HATS (STRAW)—Manufacturing starts Jan. 1st. The Hat Makers' Ass'n permits manufacturers to only make 3 dozen samples of each style prior to that time. The object is to prevent flooding the market between seasons. Also, if the retailer buys up stock too early in the season it is apt to change color and be unsalable or the style is apt to change and the retailer find he has a stock on hand which he cannot sell owing to later styles. Straw braiding is usually a separate business. In making hats, the braided straw is sewn by machinery and blocked, i. e., moistened, formed over plaster or spelter moulds and pressed in gas or steam-heated presses, then bleached or dyed, varnished or shellacked and dried. Bleaching is done by peroxide of sodium or sulphur fumes. Glue or shellac is used for sizing. Blocking presses require several rubber tube gas connections. There may also be a foundry for making spelter moulds. Paper boxes are sometimes made on the premises. The arrangement of glue kettles and construction of dry and bleaching rooms are most important hazards. A very susceptible stock and a poor fire record. See Bleaching, Dry Rooms, Sulphur.

HATTERS' FELT—See Felt for Hats.

HATTERS' FURS—See Furs.

HATTERS' SUPPLIES—Stock consists of embossed or plain lining or those stamped with maker's name, sweat bands and trimmings. Use rubber cement for cementing leather, gas crimpers for linings, embossing presses and stenciling presses. (Fair insurance.)

HAUNCHES—The parts of an arch from the skewback to the keystone.

HAY—Spontaneous combustion in sweating hay is one of the chief causes of the large barn loss. According to the Ohio bulletin, spontaneous combustion in hay originates in the following manner:

"The cells in hay continue to live and breathe for some time after it is cut, and they alone in a close mow, heat the hay to a temperature of 132 deg. F. Added to this is the heat from the microscopic spores of fungi which continue to grow in the blades of hay during its fermentation, the heat created by the development of the hay seeds and the

of the sun upon the roof. These three causes, acting ther, may heat closely packed hay stored where there is entilation to a temperature of 212 deg. F. The hay then ns to char; the charcoal formed absorbs oxygen and mass grows still hotter. The hay reaches 265 deg. F., then the mass blazes. Bran, grain and silo material may e spontaneously if placed under similar conditions."

AY AND FEED STORES—Generally crowded to the s with baled hay with more or less of it loosely scatl about. Smoking prohibited. Method of heating and ing important. Dust hazard is mild. Fierce burning endangering surrounding buildings.

AZARD—The word "hazard," as applied to fire insurance, es the same meaning as in ordinary usage, and means oint of danger, or to be in jeopardy or danger. The fire rd is the inherent quality or surrounding of a risk or of property which makes it more or less liable to conn or destruction by fire. Powder or gasoline is hazard- Frame dwellings are more hazardous than steel struc-. The risk is the thing insured, the hazard is the danger h surrounds the risk. (Fire Facts, issued by Washing-Surveying and Rating Bureau.) See Risk.

zards—There are three principal kinds of hazards: **rent**—The danger of liability to burn from causes inhero the risk, as for instance, a dust explosion is the inherazard of a flour mill. **Moral**—The danger of loss from fire r by intentional or careless neglect of physical hazor by arson. **Physical**—Any physical property, such as ior construction, environment, fire protection or fire preon or occupancy which affects disadvantageously the icter of the risk.

zards (Not Covered Under the Fire Policy) are invasion, rection, riot, civil war or commotion, or military or ed power, or by order of any civil authority, or theft. ld the assured neglect to use all reasonable means to and preserve the property at and after a fire or when roperty is endangered by fire in neighboring premises, ompany is not liable.

HAZARDOUS LIQUIDS are ethyl ether, carbon disulphide, petroleum ether, benzole, toluol, xylol, oil of turpentine, cumol oil, fusel oil, solar oil, tar oil, toluidin, nitrobenzole, xylidin, paraffine oil and naphthaline and the like.

H. C. TYPE AND PLATE CLEANING FLUID—A benzine substitute acceptable to underwriters as not dangerous.

HEADER BEAM—(Also see Chimney Construction). The beam on which is fastened the stirrups for beam supports or into which is framed the joist. It is also used in floor opening construction. See illustration on page 119.

HEADER COURSE—A course of brick laid with end outward in wall to form a bond. At least every sixth course in brick wall should be a header course.

HEAT is a physical property obtained by mechanical energy; by passing an electrical current through a substance; from the sun, or by chemical means. Can be measured with a calorimeter.

HEATERS (Water Heaters)—The gas flame flaring out, caused by wind blowing down vent pipe, has caused fires. Vents should be carried above roof and be equipped with wind deflector. Vents should never terminate in an attic or concealed space—the heat is apt to bank up and cause fire. If in contact with wood, the continued heat, while even at low temperatures, carbonizes the wood which is apt to burst into flame.

HEATING—Overhead steam pipes or hot water circulating pipes should be used. If built at floor they should be screened, with sloping surface so as not to be used as shelves. Hot air registers, especially in floors, are poor features, as rubbish and scraps may enter the hot air pipe and register.

HEATING APPARATUS—If in doubt as to whether it is unsafe or not, place the hand on the combustible material nearest the heater. If the hand cannot remain because of the heat, be on the safe side and consider it unsafe.

HEATING, COMBINATION SPRINKLER HEATING Systems—See Sprinkler and Heating Systems.

HEAT LIBERATION—It is an essential condition that heat should be evolved in an explosive reaction, otherwise

the absorption of energy due to the work done by the explosion would cool the explosive and consequently slow down the reaction until it ceased, unless heat were supplied from without. **Ammonium carbonate,** for instance, readily decomposes into carbon dioxide, ammonia and water, but in so doing it absorbs heat; consequently the reaction is much too slow to be explosive. **Ammonium nitrate,** on the other hand, is decomposed into oxygen, nitrogen and water with the evolution of heat and is consequently liable to explode. A violent impulse is required to start the explosion, but once it is started the energy (or heat) liberated suffices to propagate the explosion, unless the conditions be such that the energy is dissipated more rapidly than it is liberated.

HEAT TREATMENT PROCESS—See Hardening.

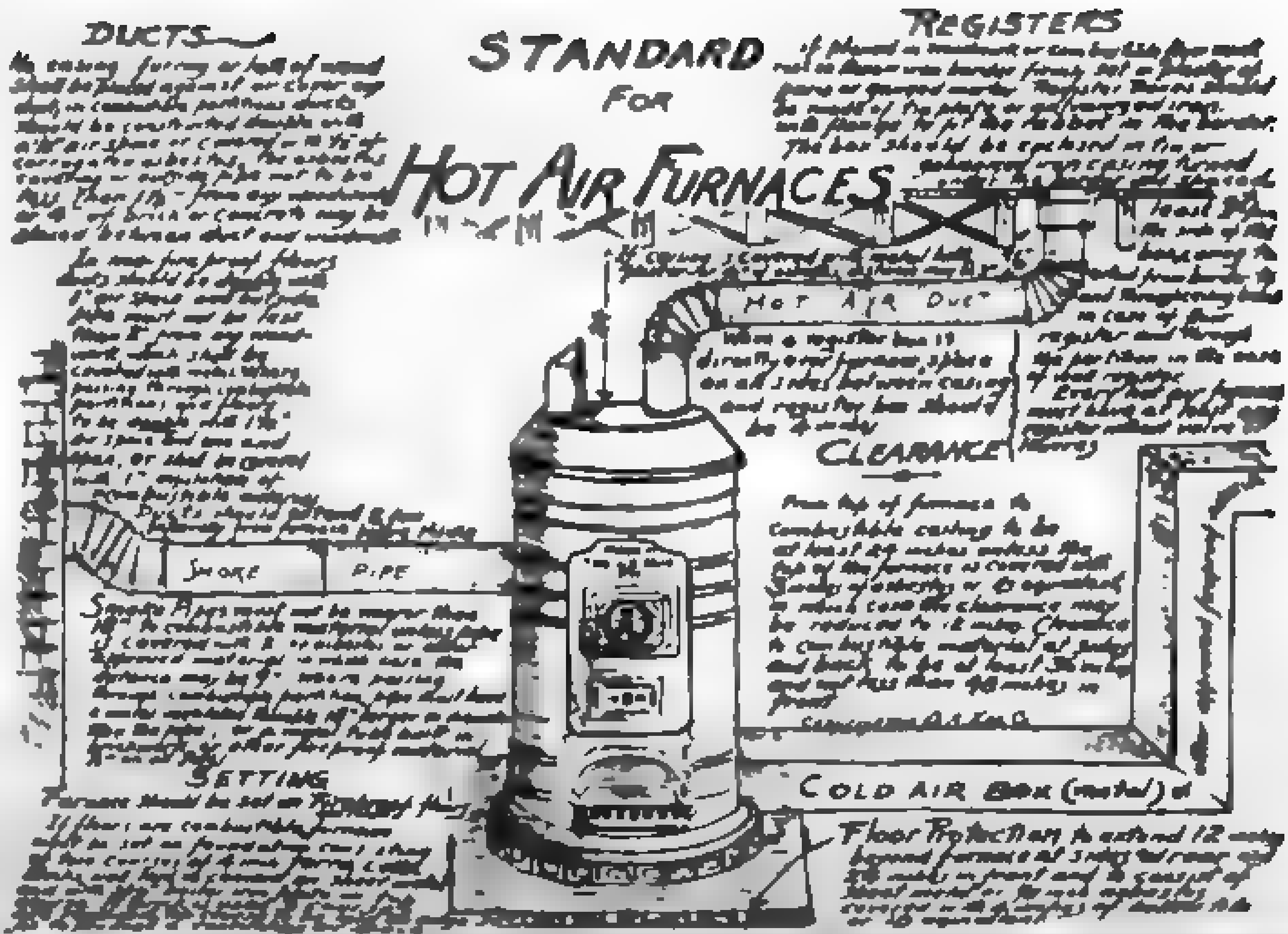
HEAT WAVES—See Hot Blast, Conflagration Blast Flames and Candle Structure.

HEAVY OIL—The fractional distillate obtained from coal tar between 225 to 270 deg. C. Inflammable.

HEELBALL—Composition of lamp-black and wax. Used by shoemakers. Manufacturing process is hazardous.

HEIGHT OF A BUILDING is the distance from the curb or street level to the highest point of the roof in case of flat roofs, or the average height of the gables in case of roofs having a pitch of more than 20 degrees. The height of a building seriously affects its insurance. It is very difficult to fight fires "up in the air" as the ordinary fire steamer or tower is not designed for excessive height. In very high buildings inside standpipes are relied on for furnishing water for extinguishing purposes. (N. F. P. A.)

HEIGHTS AND AREAS IN FACTORY BUILDINGS—Factory buildings of excessive height and area have long been recognized by underwriting organizations as a grave danger to life and property, owing to the difficulty of controlling fires in them. It is logical to assume that the men best fitted to determine safe limits of heights and areas are the men who have made a life work of combating fires under all conditions of weather and hazard. The following is the average of the replies of 50 fire chiefs throughout the country.


STANDARD
FOR
HOT AIR FURNACES
DUCTS
REGISTERS
HOT AIR DUCT
CLEARANCE
SMOKE PIPE
SETTING
COLD AIR BOX (metal)

Type of building	Stories	Area between fire-walls in sq. ft.
ick or joisted construction, not sprinklered	3.2	5.200
P. construction, not sprinklered............	5.3	9,300
ick or joisted construction, sprinklered....	4.8	10,500
P. Sprinklered............................	7.5	21,600

rom booklet, Ira H. Woolson.)

IELD IN TRUST—See In Trust.

IELICAL STAIRWAY—A spiral stairway.

IEMP—Hemp without a prefix such as manila hemp, sisal np, etc., is generally understood to mean the fibres from true hemp plant. The basis of all vegetable fibres is to be ind in cellulose, a compound belonging to a class of nat- lly occurring substances known as carbohydrates. Ordi- y hemp is classed as a soft fibre which must be handled once, if damaged, if any salvage is to be expected. From underwriting standpoint, fibres may be divided into two ncipal classes, i. e., hard and soft fibres. Hard fibres, by ue of their construction, do not absorb water rapidly en immersed and do not heat or decompose as rapidly as the soft fibres. Hemp requires about 110 days for its wth, and is cut either by hand or special machinery. The np stalks are dried, set in shooks and sometimes bundled stacked. Later the shooks or stacks are opened and the np again spread out for exposure to action of the dew, t, and sun, which dissolves the gums holding the filaments ether and makes the inner woody stem dry and causes it all away readily when passed through the breaker. Hemp osed to a heat of 300 degrees practically destroys the e. Fibres in storage warehouses, if thoroughly wet down r a fire, have been known to cause the collapse of the ding walls due to the swelling and expansion of the fibre n the excessive absorption of water. In February, 1919, he Seaboard warehouse at 435-41 East 48th Street, a large ntity of hemp was stored on various floors of this ware- se. A fire started in a pile of sulphur but was fed by the np. Tons of water were poured into the building which

caused the bales of hemp to swell, burst their bindings and push out the walls of the building. The fire smoldered for over one week. Large masses of this fibre, when wet, heat rapidly and soon decay, and unless steps are taken at once, very little or no salvage can be effected. Authorities seem to be divided as to whether fibres are subject to spontaneous combustion, although the following authorities are quoted as follows:

Hemp, especially if gathered in wet seasons, is very liable to get heated. Experience at Maysville, Kentucky, indicated that wet hemp is a very dangerous neighbor. Many of the fires that occurred there in hemp could not be satisfactorily traced to any other cause than spontaneous burning. (Harris' Insurance Chemistry.)

Hemp in a pure and thoroughly dry condition may attain such a degree of desiccation, under the influence of moderate warmth, the radiant heat from a stove or piping, and in summer from the rays of the sun, that pyrophoric carbon is formed, and the mass takes fire. (Von Schwartz in "Fire and Explosion Risks.")

T. E. Sears, an authority on fibres, states that as far as he could learn, no positive proof has ever been given that fibres are subject to spontaneous combustion. Hemp mills as a class are not very desirable insurance. Hemp in the field is a rather new feature for underwriters and very little information is available, owing to the lack of experience with this class. Owing to the nature of the soil in California, perhaps only the tall-growing single-stalk variety can be grown. The tariff rate of 6 per cent in some locations is charged and this would indicate somewhat the hazard involved. Aside from the spontaneous combustion (probable) hazard, inspectors should see that the fields are cleared of all stubble or foul stuff which would permit a fire to communicate from stack to stack; find out whether the insurance also covers in the factory or shredding building; carefully note all exposing buildings and distance from the railroad tracks on account of sparks from locomotive; gasoline tractors used in the fields; lightning, and smoking by the employees. *See* Fibres.

HEMP COMBINGS—If damp, are apt to ignite spontaneously.

HEMP HURDS—Formerly a waste product, is now being used in paper making.

HEMSTITCHING (manufacturing), employ ordinary sewing machines and gas-heated crimpers, which usually have rubber tube connections. Good insurance risks.

HENEQUEN—A Mexican fibre known as sisal. Classed as hard fibre.

HERAKLIN—Used for blasting purposes; explosive.

HEROIN—A narcotic, is derived from opium. No hazard.

HERROLIN—A liquid used in the gasoline motor industry. It is diluted with gasoline to make the gasoline vapor more explosive. It is really nothing more than highly purified and distilled gasoline which seems to regenerate other gasoline when mixed.

HIDES AND SKINS—The name "**hides**" is commonly given to the undressed skins of the large domestic animals, such as oxen, horses, etc., while those of the smaller animals are called **skins**. See Tear-offs.

Green Hides are salted and dried. The salt acts as a preservative, keeping the albumen inactive. The dried hides are dried in open air and the albumen becomes inactive and in both cases they can be kept for a long time. They are receiving today in New York City hides from Japan and China. (Good insurance.)

If **Salt Hides** become wet, the water washes out the preserving quality or salt and the albumen becomes active and they decompose very soon if not resalted, especially in hot weather. (Good insurance.)

Dry Hides wet with water become soft and the albumen becomes active and will decompose very soon if not dried almost immediately. The actual loss in both cases, salt and dry, should be small. (Good insurance.)

Dressed Hides such as harness and sole leather undergo various processes in tanning and are more susceptible to fire damage on account of the oils used in finishing. Water is apt to cause stains, but if immediately refinished the salvage *should be large.* (Not as good as undressed hides.)

Pickled Skins (brine solution) are skivers and thin hides. If dried will crack and break. These are shipped in brine in barrels. (Good insurance.)

Undressed Hides are not as susceptible to fire as dressed hides, but if exposed to excessive heat they become so hard that they will crack and break. (Not so good as pickled hides.)

Water would not have any bad effect on hides in barrels unless the barrels are open, then it would weaken the brine and possibly discolor the top hides. **Fire** possibly would not affect stock in closed barrels, and if open would only damage the top hides if salvaged at once. Should fire burst the barrels a large loss may result. Water has a damaging effect on skins, especially if not dried at once. (T. O. Gildersleeve.)

HIGH EXPLOSIVES are all explosives more powerful than ordinary black powder, except smokeless powder and fulminates. Their distinguishing characteristic is their susceptibility to detonation by a blasting cap. Examples of high explosives are the dynamites, picric acid, picrates, chlorate powders, nitrate of ammonia powders, dry trinitrotoluol, dry nitrocellulose (gun cotton) and fireworks that can be exploded en masse.

The term "high explosives in bulk" does not include such articles as benzol, toluol, smokeless powder, black powder, small-arms ammunition, ammunition for cannon with explosive projectiles, explosive projectiles or torpedoes, percussion fuzes, time fuzes, tracer fuzes, cordeau detonant, primers for cannon and small arms, blasting caps, detonating fuzes, and fulminate of mercury in bulk. Blasting caps, detonating fuzes and fulminate of mercury in bulk will be considered as constituting a distinct class by themselves and must be stowed and handled with special care.

In some cases where vessels are loaded with high explosives the following materials are not considered as high explosives unless loaded in the same vessel with the articles enumerated in the first paragraph: Picric acid, 10 per cent *wet; trinitro*toluol, 10 per cent wet; nitrocellulose, 20 per *cent wet.*

HIGH PRESSURE STEAM—Most rating bureaus conder 15 lbs. to the square inch as **high** pressure. Below this :essure they are classed as **low.** Sometimes the safety valve ın be adjusted so that when 15 lbs. is exceeded the steam ill blow off.

HIGH PRESSURE SYSTEM (New York City)—This stem is supplied by pumps. Six of 5,000 gallons capacity ch, in each Oliver and Gansevoort street pumping station. ı soon as the alarm of fire is sounded the pumps are started d 125 lbs. pressure is immediately ready. By 'phoning the mping station, this pressure is increased according to the ture of the alarm, in 25-lb. installments until a maximum 500 lbs. is reached. See Water Mains.

HIGH STOOP DWELLING—A dwelling building in ich the steps and stoop rise from the street to the second or, the first floor being nearer the level of the street. If number of steps up exceed the number of steps down, ıse leading up go to the second floor while those going vn lead to the first floor.

IIGH WINDS—See Waterfront Properties.

IIGH WINES—See Distilleries.

IIP ROOF—One that slopes four ways, thus forming an- ı called hips.

IIPS—Pieces of timber placed in an inclined position at corners or angles of a roof.

OARDING—A temporary closed fence of boards placed ınd a building in course of construction.

OFFMAN'S ANODYNE—A patent liquid said to con- alcohol, ether and oil of wine.

OG-CHAIN BEAM—A beam strengthened by tie-rods ər same sprung from end to end of beam, with straining s below, under which passes the tie-rods. Used to pre- : bending or buckling.

OG MIDDLES—Trade name for casings.

OLD DUST (a substitute for sawdust)—Composed of dust and wood fibre treated with a solution of ammonium sphate in dilute triatonic alcohol, certain salts, a disin- ant, traces of iron and aniline coloring matter. Will *burn at ordinary temperatures.*

HOLIDAY DECORATIONS—In dwellings, stores, etc. Inspectors should watch for open lights near Christmas trees, paper streamers, etc.

HOLLOW BLOCK—See Terra Cotta.

HOLLOW FINISH—Sheathing, lath and plaster, etc., for walls, ceilings or partitions, which allow a hollow space back of same.

HOLLOW METAL DOORS AND TRIM—These are considered next in merit to standard fire doors, which are too ungainly to be used in office buildings. Some time ago a fire on the 26th floor of the Singer Building, New York City, completely burned out the entire contents of a room used for the storage of old records; but was confined to the room by the hollow metal door.

HOLLOW SQUARE—A group of adjoining or adjacent buildings arranged in the form of a square with a yard or court in center. Fires communicate through the windows or other openings (unless protected) at the angles formed by the buildings.

HOOD—A metal canopy placed over a gas range, coal range, retort or other stove to catch vapors, smoke or gases and pass them out of the buildings through a vent pipe. Hoods, if covered with two inches of asbestos, may be placed not less than nine inches below a combustible ceiling. If without asbestos covering, the distance should be eighteen inches. See Ranges. See illustration, page 544.

HOOPS FOR SPRINKLER TANKS should be round because practically every portion of their surface can then be reached with paint, thereby preventing rust. Band hoops being flat cannot be reached on their inner surfaces, which in time rust away without the deterioration being noticed until they are so weakened that they burst apart.

HOP JACK—In breweries is the tank to which the beer comes from the kettles, its object being to separate the hops from the wort. After fermentation wort becomes beer.

HOPPER—A container such as a bin with spout, used for feeding grain, etc., to mills or machinery. A temporary storage bin.

HOPS are hand picked and dried in kilns on screen floor

over furnace having a pan of sulphur on top. When baled, and in warehouses, they are difficult to burn. When wet, will expand sufficiently to burst the walls of buildings, as they absorb up to eight times their weight of water. Susceptible to smoke or water damage. For domestic use are shipped in large bales wrapped in burlap. For export, they are compressed in smaller bales, wrapped in burlap, bound with metal straps and then placed in metal-lined cases.

HORIZONTAL EXITS—Openings or means of egress from a floor to the corresponding floor of an adjoining building by means of a doorway cut through a fire wall and protected by standard fire doors. See Fire Exit Partition.

HORN BLACK or **animal black** is almost identical with bone black, but is generally in a more finely divided form. Animal refuse, albumen, gelatine, horn hoof shavings, etc., are subjected to dry distillation in a still or retort; the black carbonaceous mass which is left is washed with water and powdered in a mill. Used for printers' ink, blackening, and the cheaper grade of varnishes and paint.

HORN AND FERTILIZER FACTORY—Concerns sometimes use celluloid scrap. This is mixed indiscriminately with the horn, etc., and ground by the "pressed horn and meal worker," then placed in dryers. While the temperature will not ignite the horn dust it readily fires celluloid dust and frequent fires are likely to occur. A poor class to insure.

HORSE OIL—Obtained by boiling down flesh and fat; used in making palm or rosin soap.

HORSE-POWER—This term is intended to express the amount of work that a power plant will do. The word was coined by James Watt, the father of the steam engine. He finally decided that a dray horse was capable of doing 33,000 foot-pounds of work in one minute, and so this amount of work he called a horse-power. Example—Horse pulling 3,300 pounds vertically upward 10 feet in one minute exerts one horse-power. H. P. is the abbreviation. See Foot-Pound.

HORSES—The sloping timbers which carry the steps in staircase.

HORSES AND OTHER LIVE STOCK—The policy form

usually limits the amount payable in case of loss for e animal; thus, $2,000 on horses, in case of loss, no one hc to be valued at over $200. Numerous losses have been p where unscrupulous dealers have substituted old "skat for good stock and then set fire to the stable. After a s ous fire it is hard to determine the true value of stock. ' bodies of horses which have been killed in a fire becc bloated. This, and the fact that all the hair and skin h been burned off, make it almost impossible to judge value of the animal. See Stables.

HORSES STABLED ABOVE GRADE—See Stables.

HOSE—**In the manufacture of fabric-covered rubber h** the hazards are those of rubber working with vulcanizi weaving and covering. If covered with flexible metal, th is a machine shop hazard, with metal spinning. This hos vulcanized in a vulcanizer sometimes 30 feet long. Insp tors should be careful to note if hose has rotted at conn tion to coupling. This often occurs from water leakage from polishing materials gradually eating fabric.

HOSE LEAK STOP—A device for temporarily repai a bursted hose.

HOSE ROLLER—Wooden device with rollers to p on edges to allow hose to be drawn over same witl injury.

HOSE STREAMS (**Effective height of**), according t V. French.

1⅛-inch smooth nozzle Length of hose	Limit of height, with moderate wind With 100 lbs. at hydrant	With 80 lbs. at hydrant	With 60 ll at hydra
ft.	ft.	ft.	ft.
100	88	82	67
200	82	72	59
300	74	65	52
400	67	58	44
500	62	52	40
700	53	43	33
1,000	42	34	25

HOSIERY AND UNDERWEAR STOCKS—Usually in pasteboard boxes. Woolens are subject to shrinkage or stain if wet. Cotton goods can be washed and salvaged. Good insurance.

HOSPITALS—Usually consist of a group of ordinary constructed brick buildings with frame roof structures or cupolas, and freely communicating, and with unprotected floor openings, especially stair wells. Fire hazards are laundries, kitchens, paint and carpenter shops, medicines or oils boiling over on stoves, storage of drugs and chemicals, including ether, Columbian spirits, and alcohol, and other common hazards. In cities, hospitals have fire drills of all employees, including nurses and staff, with fire alarm systems and standpipes with hose. The fire record is good.

HOSTILE FIRE is one that leaves its seat of origin. See Friendly Fire.

HOT BLAST—Is a term used in conflagrations. In the Chicago fire, the fire started outside the congested district, developed into hot-blast form, then swept through and beyond the congested district, and finally burned out for lack of fuel. These fires cannot be stopped by firemen while the wind holds out, but they have been checked and deflected upwards by barriers consisting of two or more fire walls, or their equivalent, with a free air space between as in the case of fires out of control, which have been stopped by a mere alley, with buildings fully shuttered on each side. (From paper by Albert Blauvelt, Before American Society of Mechanical Engineers.) See Flames; see Conflagration Blast.

HOTELS, especially of the better class, are considered good risks. This is due mainly to the superior management and careful scrutiny given by all in charge, day and night. As a general rule the construction of the non-fireproof hotel is not so good on account of the large well-holes, furred walls, and poorly protected floor openings. They are inspected regularly by city departments on account of the lives at stake, and the fire fighting equipment is usually in good order. Fires have been caused by chefs pouring grease on top of ranges for the purpose of hastening cooking by getting top of range red hot. One of the "most common" causes

attributed to fire in the above class of risks is the ignition of greasy vapors in the vent pipe of the kitchen hoods caused by flash fires on the coal or gas ranges, broilers or griddles. These vent pipes in many cases are of very light material (entirely inadequate to withstand grease fires) and are sometimes soldered at the joints. The vent pipes or flues should be constructed no less substantially than the brick flues or heavy iron stacks of steam boilers.

Some Boards of Fire Underwriters are now requiring all vent hoods to be equipped with a steam jet connection (¾-inch to 1-inch piping) with an ordinary hand valve close by, to be turned on should a fire occur in the vent. In some breweries the steam jet connected to the malt mill and the elevator leg is made automatic in the following manner:

Have the steam pipe connected (with steam trap) direct to a safety valve arranged to be normally open by means of a counterweight. Fasten a twine to end of lever holding counterweight, over a loop with weight attached to keep safety valve closed; then insert twine in and across vent flue and fasten to outside wall. In the event of a fire in the flue the twine would burn and automatically release the steam, the operation being similar to that now used in many malt mills. See Apartment Hotel; also Seashore Hotels.

HOT HOUSES connected with florist shops, fair risks if heating apparatus is safe.

HOUSEHOLD INVENTIONS—Consist of kitchen utensils of tin, aluminum, enamelled, plated and japanned ware. Hazards include wood and metal working with japanning by spraying or dipping. Fire record of class is poor.

HOUSEKEEPING—This expression is used to denote the care and cleanliness about a plant. See Dust.

HOUSE WRECKERS OR MOVERS—Equipment consists of ropes, rigging, tackle, lubricating oils, second-hand lumber, shoring timbers, building materials.

HOUSINGS—In roller mills, the vertical supports for the boxes in which the journals revolve.

HOWITITE—A high explosive.

HUMIDOR—A box or room (usually of wood), in which

cigars are kept moist by using wet sawdust on the floor or by sprinkling water on the floor.

HUMUS—A vegetable dry rot called muck. Used for fertilizer. To be valuable must contain 5% potash. Drying and screening in manufacturing are important hazards.

HYDRANT PRESSURES according to E. V. French.

The following table shows the hydrant pressures needed with various lengths of hose to discharge 250 gallons per minute through a 1⅛-inch nozzle:

Length of Hose	Pressure at Hydrant
100 feet	63 lbs.
200 "	77 "
300 "	92 "
400 "	106 "
500 "	120 "
700 "	149 "
1000 "	192 "

HYDRANTS—The approved fire hydrant or fire plug is so constructed that when the valve is closed by raising a flange on the rod all the water remaining in the hydrant is allowed to escape through an opening at the bottom where it runs to waste into the ground, through the open lower end of the frost jacket. This jacket is a hollow cast-iron cylinder surrounding the working parts of the hydrant. Without this arrangement, water remaining in the hydrant would freeze and burst the hydrant. Upon the approach of winter all hydrants should be tested for proper draining to prevent freezing. Never be satisfied with a pressure test only; a test for volume is the criterion of the working value of the hydrant. See Hose Streams.

Hydrants for mill use should be arranged so as to prevent long runs of hose, i. e., over 100 feet. To accomplish this they should be placed around the building approximately every 200 feet. It would be preferable to have them within 50 feet of the building.

HYDRATE composed of salt, metals, oxide, or acid with water.

HYDRAULICS is the science of the flow of water through pipes and the raising of water to various heights.

HYDRO-CARBON OIL is obtained from crude petroleum and from the tar obtained from bituminous coal. Flash 200-500 deg. F.

HYDROCARBONS are compounds containing hydrogen and carbon only. Flashes at zero F. Generally classed as inflammable.

HYDROCHLORIC ACID (muriatic)—A corrosive liquid formed by combining hydrogen with chlorine. Not inflammable. See Acids. Usually kept in carboys. Is capable of bursting carboys if overheated, owing to pressure of gas evolved. The danger lies in leakage and possible mixture with other chemicals likely to cause fire or explosion. It should be stored in a cool place away from the sun and not near other chemicals, waste material or metals.

HYDROCYANIC ACID—An unstable, volatile, colorless and extremely poisonous liquid compound formed by decomposing metallic cyanides with hydrochloric acid. Odor and color resemble bitter almonds. Boils at 79 deg. F. Liquid is combustible. Not used in common lines. Used for fumigation of vessels; also for destroying the flour moth in flour mills. It will burn, has no flash point.

HYDRODYNAMICS—There are four important but simple considerations which must be kept in mind for understanding the dynamics of water pressure. **First,** water, like other liquids, exerts equal pressure in all directions owing to the fact that its molecules move freely over and upon each other. Pressure exerted upon water in a hollow ball with numerous perforations would expel the water from all the perforations with equal force. This, it need not be explained, is the principle of the hydraulic press, where the pressure of a small pipe of water exerted over a wide surface shows the same pressure for every square inch of such wider surface. It is the principle upon which an inch pipe inserted tightly in a barrel full of water will burst the barrel when the water reaches a certain height in the pipe, although the weight of water in the pipe may be trifling. **Secondly,** water, like any solid, has a known weight for a given quantity.

Third, water will flow with less or greater velocity through pipes according to the pressure exerted upon it, which pressure may be simply that of its own weight, due to its elevation above the point of escape from the stored body or the pressure exerted by a force pump. **Fourth,** water, like a solid in motion, is subject to the retardant effect of friction of its surface against the surfaces rubbed against. Consequently water flowing through a pipe is retarded in its flow by the friction of its particles on the sides of the pipes, what is known as "skin friction," naturally greater in rough interiors of pipes than in new, smooth ones. (From lecture F. C. Moore.)

HYDROFLUORIC ACID—A fuming corrosive liquid made by treating a mineral, known as fluorspar, fluorite or calcium fluoride with sulphuric acid. It decomposes glass. Boils at about 70 deg. F. (See Etching Acid.)

HYDROGEN, the lightest of all gases, burns with a pale, blue flame, giving out much heat. Hydrogen gas is inflammable. Many explosions occur from the use of this gas. In Norfolk May 27, 1919, several people were killed and injured by a series of explosions resulting from a fire in a hydrogen gas plant. Such fires are very difficult to extinguish.

HYDROGEN PHOSPHIDE—(Phosgene). Ignites spontaneously on contact with air.

HYDRONETTE—A portable fire fighting device consisting of a squirt gun and pail of water.

HYDRO-SELENIDE—An inflammable gas.

HYDROSTATICS is the science which treats of quiet water or water at rest in a reservoir.

I

I BEAM—An iron or steel beam, the cross section or end view of which is the shape of the letter "I".

ICE CREAM CONES—See Wafers and Cones.

ICE FORMATION—(In sprinkler piping in risks involving mechanical refrigeration). As a preventive measure, up-to-date plants have an apparatus for reducing the amount of moisture in the air used in charging the dry pipe system. This apparatus consists of an air pump taking air from a small refrigerator room constructed especially for the purpose. It is called the air chiller, and discharges back through coils and a settling drum located in the same room. A valve is placed at the bottom of the settling drum for drawing off the accumulation of water removed from the air. See Ring Ice Formation.

ICE HOUSES—Usually large, light frame construction and filled with salt hay, sawdust or hay between each cake of ice. Inspectors should note if located near water that is pure and not contaminated. Sweating hay is subject to spontaneous combustion. Instances have been known where the owner has kept the ice so long that it froze into one mass and could not be removed except by blasting, in which case the ice has no market value. The moral hazard should always be investigated. Fires are quite common in this class.

ICE-MAKING—There are two distinct methods of freezing the water by the same evaporating agents. One is the **Can System,** whereby the filled cans are almost entirely immersed in brine which is kept cool by ammonia expansion coils. An agitation of the brine is secured by means of propeller wheels in the brine, usually operated by a motor.

The other is known as the **Plate System,** where cells are *filled with water.* The walls of the cells are iron plates form-

ing a chamber, inside of which coils are placed through which brine is circulated or in which ammonia is expanded. With this system, the freezing progresses from each side and toward the center, but so as to form two plates of ice, the freezing process being arrested before the center is frozen. Iron bars are frozen in these cakes, with which they are raised out of the cells by cranes and pulleys. The cakes of ice are loosened from the plates by turning warm water into the coils. It is claimed for the plate system of ice-making that the product more nearly approximates natural frozen water, and that artificial cooling of the ice storerooms is not necessary, whereas with the can system a temperature of about 28 degrees must be artificially maintained to prevent the ice from melting. Good insurance risks.

IDE—When used in connection with salts are those having no oxygen. Also used in other ways.

IDLE PLANTS—Generally not attractive fire risks. However, if in good repair and in charge of a competent watchman may be fairly desirable. Rating organizations usually charge one-half of the regular fire rate for idle plants, if watchman and clock service is maintained.

IFE—A white fibre from which cordage is made.

IGNITION—Means becoming luminous by the application of heat or friction.

IGNITION POINTS OF WOOD—Pine, 815 deg. F.; whitewood, 825 deg. F.; cherry, 905 deg. F.; maple, 825 deg. F.; ash, 825 deg. F.

ILLUMINATING GAS OR VAPOR—The generating of it on the premises is not covered by the fire policy unless provided for by agreement in writing.

IMITATION LEATHER—Paper, cloth, wood pulp, celluloid, fibre and cloth sheets are the main bases. These are sized, impregnated with nitrated cotton in paste form in a calender (set of steam rolls), dried, varnished, painted or embossed or enameled. This is a hazardous process, including picking cotton and drying nitrated cotton (the same process as in making celluloid). The mixture is inflammable, and the vapors are explosive. The cellulose is mixed with substances like clay, with oils to add to the

spreading qualities and then colored. As in making oil-cloth, the coating process is repeated for desired thickness. This latter feature should be in a fireproof cut-off section. Embossing press and corrugating machines are mainly gas-heated. The nitrating building, picker house, boiler room and storage buildings should be detached. Usually a "not attractive" class. See Leather.

IMITATION MARBLE AND ONYX are usually made at slate quarries. The slab of slate is cut, ground and polished smoothly, and gradually submerged in a vat or tub of water. The water is streaked with paint which adheres to the slate as it submerges. When removed, the slate is baked in a kiln, polished, varnished, dried and rubbed with oils to obtain a high finish. Benzine or turpentine paint are sometimes used.

IMPOST—The upper part of a pier from which an arch springs.

IMPROVED RISK—The risk which is superior to the ordinary by reason of better construction, fire protection or fire prevention features.

IMPROVEMENTS—This class of insurance should be written with extreme care, and should, wherever possible, be included in the building or contents items. Where the improvements to buildings are written separately from the insurance on the building, they usually take the building rate with an additional charge added thereto. Insurance complications are likely to ensue after a loss unless the same insurance company insures both the improvements and buildings. Inspection should always be made to determine the nature of the improvements. It may develop as very good insurance such as a new brick front, or on the other hand, it may be very poor insurance such as highly ornamental plaster ceilings, mirrored side walls, fresco work or wall paintings. Tenants who install permanent improvements such as mentioned above have an insurable interest in same although they properly belong to the owner of building, who (by virtue of ownership) may claim damages in case of fire. In this instance it is possible that the same loss might be paid twice, both to tenant and owner. When insuring improvements

d betterments do not use language which would (in case fire) make the amount of loss independent of limitations assured's interest, nor independent of the landlord's in-rest or insurance. A good form for this coverage is follows:—On improvements to building of every kind ıd description consisting principally of alterations, additions ıd decorations introduced or paid for by the assured all hile contained. . . . Only competent underwriters should :cept "Improvements" insurance.

INCANDESCENT ELECTRIC LAMPS called in the ade "carbon lamps." They are being rapidly replaced by azda and Tungsten lamps. An extensive detail process ıt briefly described is as follows: Glass bulbs received with ıllars attached, two copper wires tipped with platinum are serted and the filament put on. The filaments are of ordi-ıry absorbent cotton in solution of zinc chloride, injected to wood alcohol under air pressure in a bulb which solidi-:s the filament; placed in carbonizing furnace where it mains until carbonized. The temperature is about 4000 :g. F. Flashing follows, which process is, passing an ectric current through the filament in the presence of ısoline vapor. The flashing apparatus consists of a glass ıntainer of gasoline from which is passed a rubber tube ı a vacuum vessel containing the filament which is held by amps connected with electric current. The current passing ırough the filament brings it to incandescence, and the ısoline vapor passes into the vacuum, the vapor being roken down and a black metallic appearing covering of ydrocarbon deposited on the filament. It is then cemented) the platinum (or substitute) wires. The bulb and the ıount are fused together and the air exhausted from the ulb. A more perfect vacuum is created by the use of morphous phosphorus and alcohol. (Numerous spark res due to friction are caused at this point more than at ıy other in the process.) The lamps are tested with electric ırrent, to determine the candlepower and defects, then ıcked and shipped. Electric hazard severe. Glass blowing, .ow pipe work, use of alcohol, zinc chlorides and amorphous ıosphorus, sulphuric acid, nitric acid, ammonia solution,

compressed hydrogen, hydrochloric acid, carbonizing ovens, flashing with gasoline vapors, buffing and packing are the usual hazards. Also use red or white phosphorus for coating filaments, which is sometimes sprayed on. This work should be done in a separate fireproof building, detached where possible.

INCANDESCENT GAS MANTLES—Are made of cotton yarn which is sewed and tied to a mantle holder which fits the gas fixture. The yarn is first impregnated with thorium nitrate, shaped in gas heated machine similar to a tentering machine, dried on a moving roller or traveler over gas burners which also burn out the yarn leaving only a shell of thorium. These shells are then dipped in an open tank containing a solution of castor oil, collodion, acetone and wood alcohol. They are then dried and packed. The dip tank is under the gas heated shaping machine. Principal hazards are weaving cotton yarn, the arrangement of the gas heated appliances, the handling of acetone, collodion and wood alcohol. It is claimed that the large percentage of castor oil contained in the dipping solution makes the mixture non-combustible. The fire record of the class is not good.

INCENDIARISM—The act or practice of maliciously setting fire to buildings. See Pyromaniac.

INCENSE—The material is a mixture of powdered charcoal, starch and perfumes, molded into small cakes and dried. The only severe hazard is the grinding of charcoal.

INCINERATORS are of various types, small ones used in dwellings for burning ordinary refuse, those in hotels for disposing of garbage, refuse, etc., and the public disposal plant. The first resembles a fire-brick lined stove with ordinary hazard. In the hotel where quantities of garbage are burned, the incinerating takes place in a chamber into which is dumped the fuel such as wood, paper and coal and the refuse and garbage. Oftentimes fuel oil is used to more quickly dispose of the matter. The incinerator is fed from the top through a large hole which is closed with an iron cover. As the room or enclosure where the incinerator is used is the dumping place for all kinds of rubbish,

it very naturally is untidy at times. The setting of the incinerator and cut-offs from balance of risk are subject to the same rules as for a boiler installation.

Those for public use, as employed by street cleaning departments (not garbage extraction plants), vary in size according to the tonnage of the daily material to be burned, based on the population of the municipality. The larger the capacity, the greater the hazard as new features are introduced in the larger ones. The smaller plants of one to five tons daily capacity are more compact and the boxes, mattresses and other inflammable material is sufficient fuel to burn the wet material or garbage. Fuel oil or coal may be used, and the fuel oil burner may become a serious feature. They are fed similar to the one described for hotels. The plant ordinarily is only a shed covering the furnace and protecting it from the elements. In city plants of large area a high 1 story corrugated iron and brick structure and a battery of furnaces are employed. In some, the collecting wagons drive up a ramp and empty their contents into the fire. In others, the material is picked over by scavengers to salvage salable articles. Where paper is handled separately, it is dumped on a traveling belt and sorters pick out certain pieces as the material passes them, throw them into bins after which they are baled. This department is cluttered with loose and baled paper and rags. Tin cans are sometimes melted in a separate furnace to reclaim the solder, and the other metal is made into sash weights. The surroundings of such a plant are such as will be found around any street cleaning dump. All plants and equipment are built especially for each city and usually by competent engineers. Special hard burned bricks are used for furnace linings and extreme care is used in erecting the stack. Ordinarily they are considered a nuisance to surrounding property. See Extraction Plants.

INCOMBUSTIBLE—Materials which do not readily burn when subjected to ordinary fire.

INCOMBUSTIBLE BUT NOT FIREPROOF—The term refers to steel skeleton construction built with unprotected iron work.

INCREASE OF HAZARD—The policy states that if there be any increase of hazard, the assured shall notify the insurance company. The courts have liberally interpreted this clause, giving the insured the benefit of the doubt in most cases. An increase of rate does not necessarily signify an increase of hazard.

Increase of Hazard Invalidates Policy—Policy covered stock of paper in rolls in warehouse but later stock was chiefly paper stock including rags and old paper. After policy was issued physical hazard materially increased and insurer was not notified of change in the character of property. Company contested the claim of loss and was upheld before Judge Mack of the Federal Court, Southern District, New York. (Commercial Bulletin, November 7th, 1918.)

INCUBATORS AND BROODERS—The most popular is the type heated by kerosene oil lamps. The end of the incubator should be protected with non-combustible material plus an air space of at least 1 inch between the metal shield and the incombustible material. The heater should be all metal with riveted joints. The heated air pipe entering the incubator ought not to be in contact with the woodwork. All woodwork should be protected with metal or asbestos. The lamp should be of metal bowl type, rigidly set, and arranged so that it cannot be filled while lighted or while it is in the incubator.

Brooders should be of non-combustible material. In place of kerosene oil type, some employ hot water, gas or electricity, and the rules governing the installations of these are those of approved general practice. Kerosene oil-heated types of brooders or incubators have a poor fire record.

INDEPENDENT WALL—An outside wall carrying loads of but one building.

INDIA RUBBER is the solidified sap of the rubber tree. If ground and in bulk, subject to spontaneous combustion. See Caoutchoucine.

INDIA RUBBER CEMENT is India rubber solution of coal tar naphtha.

INDIAN COTTON, called **Lintus** or **Linters**, is similar to shoddy.

INDIAN HEMP—A black fibre called Ejoo.

INDIAN SPIRITS—A benzine substitute; acceptable to underwriters; has a flash point of about 105 deg. F.

INDICATOR POST OR POST INDICATOR—See illustration on sprinkler diagram, page 636.

INDIGO—A blue coloring substance originally obtained from the indigo plant; now artificially prepared as a coal tar product. In underwriting, care should be taken to see that this stock is kept away from other stocks. A hose stream played on this material will cause colors to run through the building and damage other stocks. It is usually imported in thick tough leather bound with thongs of reed called ceroons. See Ceroon.

INDIGOTIC ACID—See Anilic Acid.

INDIGOTINE—A dyestuff used in the color blue.

INDIRECT SYSTEM OF COLD STORAGE—See Cold Storage.

INDIUM—A metal found in zinc ores. It decomposes water at a high temperature, volatilizes at high temperature and burns when heated in air.

INDUCTION MOTORS are less liable to spark than D.C. (direct current) motors, yet they are apt to give off sparks for various reasons. If a motor becomes overheated and insulation starts to burn, sparking occurs. The same is true in case of a faulty motor or when a motor is overloaded. Motors of any type should not be allowed in rooms where explosive vapors may be present.

INFANTS' AND CHILDRENS' WEAR—Usually white goods. Susceptible, but if attended to at once after a fire, considerable salvage can be derived. Subject to mildew and the colors running from ribbons. Usually kept in glass show cases. Knitted wear for infants is usually sulphur bleached and is very sensitive to air damage. Vapor laden air from an exposure fire is apt to penetrate the boxes containing the goods, causing spots due to the sulphur bleach having been affected by the moist air.

INFLAMMABLE AIR—Another name for hydrogen gas. See Hydrógen Gas.

INFLAMMABLE LIQUIDS should be stored in rooms

constructed of 8-inch brick or 6-inch tile walls with similar roofs and doors with sills raised 4 to 6 inches to prevent the liquid from running into other rooms. All doors should be standard automatic, and windows wired glass (double glazed preferred) in hollow metal sash and frame. Good ventilation is a primary requirement. All liquids flashing under 100 deg. F. are classed inflammable.

INFLAMMABLE VAPORS—Those heavier than air settle close to the lowest level and are present in an invisible stream leading to an opening of any kind such as a door or stairway. An open light 100 feet away may be sufficient to ignite this vapor. Precautions as to ventilation, electrical devices, vent fans, etc., are the necessary requirements.

INGOT—A lump of cast metal, as for instance: a pig of cast iron.

INGOT IRON—Usually called Bessemer Steel.

INHERENT HAZARDS—The hazards found in the ordinary risk of a given occupation aside from the common hazards of light, heat and power or of special processes. See Hazard.

INITIALS—It is well not to pass a line of insurance without ascertaining the first name of the assured. Many women use the initial of the first name without prefixing Miss or Mrs. This is often resorted to as a subterfuge to mislead the insurance company into believing that the insured is a man. See Women's Names.

INK (Printing Ink)—Ordinarily made of linseed oil, lampblack, soap and nut oils, dry colors, Japan, varnish and rosin oil. Manufacturing requires the use of grinding mills, mixers, calenders, kettles and furnaces. Ink mills usually consist of three calender rolls, steam-heated, one revolving in the direction opposite to those above and below. The paste is ground between the rolls for mixing and smoothing. A hard burner with heavy smoke.

INORGANIC CHEMISTRY—Refers to the chemistry of the mineral kingdom.

INSECT AND VERMIN EXTERMINATORS—May contain carbon bisulphide, gasoline, or other similar sub-

stances. Rat exterminator can be made of ground sponge saturated with flour, sugar, grease, barium carbonate.

INSPECT (HOW TO):—Always stand facing the building about to be inspected. This will give you the construction of the front and side walls and also the exposures (except rear). The opposite side will be the front exposure; the building to the right will be the right exposure, while the building on the left will be the left exposure. All openings and window protection should be carefully noted at the same time. If the building is sprinklered or protected with a standpipe system, the Siamese connection should be noted before entering the building. Next enter the building and proceed to the roof without making any notes, but with eyes wide open taking in the general construction so as to determine whether of fireproof, mill or ordinary type. On the roof, note the rear exposures first, then kind of roof, i. e. metal, composition, or tile, parapets, cornice, bulkheads pent houses, skylights over shafts, etc. Then start to descend stairway, note enclosures and type of doors; on the top floor, note construction of elevator, pipe and light shafts and other floor openings, finish (whether solid or furred), type of floors (whether ordinary, single or double thickness) or fireproof arch; then note the occupancy; name of tenant; manufacturing or stock; number hands; special processes, hazardous features cut off, machinery and type used; communications. Repeat this same process on every floor. As you descend, the occupancy may be different although the general construction should be approximately the same as noted on the top floor. When you arrive in the basement if the building is of fireproof construction you may be able to determine the protection to the steel work, if no other means were available before this time. The boilers if high pressure should have a brick or other fireproof arch ceiling over them and the sidewalls should be at least 12 inches thick with an automatic fire door at the opening. If the boiler is under the sidewalk, all that is needed is a standard fire door at the opening.

INSPECTIONS—These hints will be found helpful to put premises in condition for new tenants: See page 370.

Fire Underwriters' Uniformity Association

KEY TO PLAN NOTATIONS

Adopted 1908 Revised 1912

COLORS

Yellow; Wooden walls.

Red; Brick walls.

Blue; Stone or Concrete walls.

Gray; Iron walls.

Brown; Fire proof construction.

Brown (Mottled); Reinforced concrete construction.

If hollow block concrete, so mark.

When walls are not of a single material, use the proper colors in combination.

Example; Wood, Metal clad.

Exposures; Color in outline.

Wood platforms; Cross hatch in yellow.

Water courses; Light blue.

CORNICES, ROOFS, ETC.

4 Sto. Bsmt. & Attic in height.

Height of Bldg. in feet.

Composition Roof.

FLOOR OPENINGS

Open Hoist or Dumb Waiter.

Trapped Hoistway.

Enclosed Hoistway.

Open Elevator.

Trapped Elevator.

Enclosed Elevator.

Elevator in brick shaft.

Elevator 1st to 3rd floor.

Open Stairs.

Enclosed Stairs.

Stairs in brick well. Cond. sign if parapeted.

Stairs Bsmt. to 1st Floor.

SECTION SIGNS
FLOOR CONSTRUCTION,

Roof, open joist.

Line of eaves.

Sheathed Floor & Wall.

Plank & Timber or Mill Const. floor.

Brick Arch floor.

Fire Proof floor.

PROTECTION

Water Pipe buried.

Water Pipe exposed.

Suction Pipe.

Foot Valve & Strainer.

Non-frostproof Hydt. (1 way).

Frostproof Private Hydt. (2 way).

Public Church or Flush Hydt.

Public (2 way) Hydt. with Steamer Connection.

Priv. (2 way) Hydt. with independent Valves & Hose House.

Vertical or Stand Pipe.

Hose Connection on pipe.

Automatic Sprinkler Riser.

Open Sprinkler Riser.

Open Sprinklers.

Underground Valve requiring key to open.

Ordinary Gate Valve.

Globe Valve.

[illegible] Cornice.

Wood Cornice.

French Roof.

Driveway on first floor.

Skylight, W. N. for wire net.
W. G. for wire glass.

Light Well, 9 Stories.

WALLS AND WALL OPENINGS

Light line; Wooden wall.

Heavy line; Brick, Stone, Etc.

Walls not complete to roof. Number of floors pierced to be noted.

Parapet wall. One line for each 6 in. parapet.

Unprotected wall opening.

Standard Fire Door.

Non-standard Fire Door.

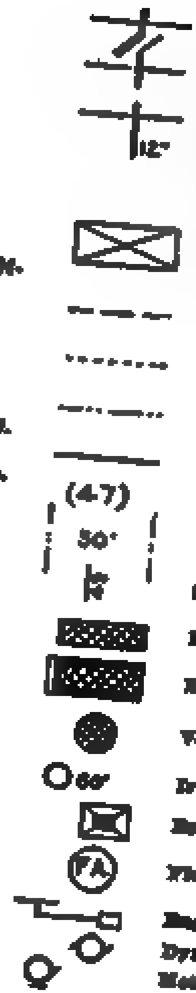
Window & Non-std. Shutter (1 Sto.)

Windows & Std. Shutters (3 Sto.)

Non-std. Wired Glass Window (3 Sto.)

Standard Wired Glass Windows.

Protected Windows, 2nd & 4th. 1st Unprotected. No opening 3rd. Dot represents openings counting from left to right looking toward Building.



WALL OPENINGS.

Parapet Wall.

Standard Fire Door on one side, Non-standard on other side.

Unprotected Opening.

Thickness of wall in inches.

MISCELLANEOUS

Underground Gasoline Tank; dotted circle.

Stable.

D. Dwlg. S. Store.

Open Sheds.

Platforms. Also Bridge or Tunnel if so labelled.

Property Line.

Fence.

Grade above sea level (feet).

Width of Street (feet).

Street Number.

Boiler not bricked in.

Boiler bricked in.

Vertical Boiler.

Iron Stack 60 Feet high.

Brick Chimney.

Fire Alarm Box.

Engine.

Dynamo.

Motor.

Post Indicator Valve.

Check Valve (water flows in direction of arrow).

Check Valve with Alarm Attachment.

Alarm Valve.

Alarm Gong with Hood.

Dry Pipe Valve.

Siamese Steamer Connection.

Steam Fire Pump with Hose Connections.

Rotary or Centrifugal Pump.

Spkr. Pressure Tank.

Spkr. Gravity Tank on plan.

Spkr. Gravity Tank on section.
........Gal. cap. ....Ft. above.

Water Meter.

Valve in Pit.

Automatic Sprinklers.

Perforated Pipe Sprinklers.

Cotton, Rubber Lined (hose).

Fire Escape.

(1) Remove all rubbish.

(2) Repair broken plaster, ceilings, floors, walls and windows.

(3) Provide metal rubbish cans.

(4) Provide metal ash cans where coal stoves are used.

(5) Provide self-closing oily waste cans where there is machinery or motors.

(6) Properly protect all woodwork under all stoves and where too close to smoke pipes, etc.

(7) Connect all gas appliances with rigid iron pipe.

(8) Firepails are needed at the ratio of one to each 500 sq. ft. of floor area.

(9) Stock should not be piled nearer than 2 feet to ceiling.

(10) Skid stock 6″ above floor.

(11) Aisle space of at least 2′ should be provided.

(12) Excelsior should be kept in standard packing bins.

(13) All changes in electric wiring should be made by an electrician and approved by the Board of Underwriters.

(14) Cage gas lights which are 2′ or less above tables, benches, etc.

(15) Remove swinging gas brackets or make them rigid.

(16) Place metal shields on ceiling above gas lights which are within 36″ of ceiling.

(17) No gas light should be within 18″ of ceiling.

(18) Properly protect cluster gas lamps.

(19) Benzine, gasoline, etc., should be reduced to 1 quart in a (1) qt. safety can.

(20) Paint should be reduced to the absolute minimum, and where possible placed in safety cans.

(21) Protect pressing tables in a standard manner with metal.

(22) Provide metal receptacles for clippings.

(23) Clean oily floors with lye and ammonia.

(24) Place drip pans under oily machinery.

(25) Sand only to be used for absorption purposes.

INSPECTOR—One who inspects the risk on which a *company assumes* liability. He should have a good knowl-

edge of building construction and hazards and also know something about machinery, electricity and chemistry.

INSPECTORS should "train their noses" as well as their minds and eyes. In these days of new processes, the olfactory sense will often indicate and detect the use or presence of substances which may not be visible but which can be detected by smell if the inspector is familiar with odors.

The best inspector is not always the one who boasts loudly of his education and finishes his day's work in spotless clothing, immaculate linen and with lily-white hands. There are many inspectors arrayed thusly who can only be dubbed, "The Sign Readers." The ambitious, conscientious and successful inspector will always endeavor to obtain all the information due him, in probing for causes, conditions and results, with the manner of a gentleman, the speech of a diplomat and the common sense of a man. He will always attempt to investigate "concealed spaces," whether he begrims his skin or his clothing. And last but not least, he will never allow himself to think, or act as though he believed, that he owns any person's property, because he bears the title, Inspector. The assured invariably judges the company from the speech or actions of its representative. In fact, let the Inspector who thinketh he knoweth it all, take heed, lest he be made ashamed, because that type of an Inspector is usually a pronounced failure. Inspectors should always point out the defects of a risk to the tenant and offer suggestions towards their correction. All processes, special machinery, common hazards and exposures, should be set forth in the report. There is a wide difference between inspection work by rating bureaus and the work done by individual companies. In the former, construction and the physical hazards as relating to rate-making are noted, while in the latter the "human element" enters, i. e., the moral hazard, general appearance, prosperity, class of help and other features which a company requires for underwriting purposes and which are not brought out in the rating schedule.—(Chas. E. Jahne.)

INSPISSATION—The process of bringing a liquid to a thicker consistence by the evaporation of the thinner parts.

INSTRUMENTS (SURGICAL)—The hazards are those of machine shops with forging, annealing, emery wheels, blow pipes, engraving. The parts are usually cleaned with benzine to remove grease or oil and treated in a bath of nitric and sulphuric acids. Instruments and razors are subject to rust from dampness and do not necessarily have to become wet. Susceptible. In case of fire, damage will surely be large.

INSULATE—To cover with a non-conducting substance.

INSULATED—A body is insulated when it is separated from other bodies by a non-conducting substance.

INSULATING COMPOUND—For electric wires and cables, the composition is principally rosin, pitch, parafin, gilsonite, montan wax, grahamite and prepared asphalt. These are heated in steam kettles or Mott kettles with direct fire heat. Such a composition has a very high flash point. A Quick burner.

INSULATION, on electric wires, in burning give off fumes which are injurious to or will suffocate firemen when fighting fire.

INSULATORS—Substances which do not conduct electricity such as glass, gutta-percha or porcelain. See Air Space; also Asbestos Insulators.

INSULITE—A compound made from wood, cotton waste and a secret binder. The manufacturing process is hazardous.

INSURABLE INTEREST is the interest of persons in property, who by reason of a fire, would suffer a financial loss.

INSURANCE—A system of collecting sums of money (called premiums) from a number of people to pay the losses of a few. The rate therefore should be graded according to classes of trade to effect an equal distribution of the cost (premium) among those businesses which have shown a larger percentage of fires than some others.

INSURANCE BROKER, one who negotiates insurance contracts and in all cases represents the assured and not the Company.

***INSURANCE* LAW**—See Law.

ITERIOR DECORATORS—Those occupying small s or grade floor stores are considered desirable insur- risks when they have only a few pieces of furniture or eries on display, while other shops may be crowded furniture to be remade, antiques, odds and ends, eries, stocks of wall-paper and present an untidy condi- The higher class concerns usually occupy several of a building in a good section with offices, show- s and workrooms. Here we may find upholstering, ry-making, sewing and furniture repairing. See ers.

TERRUPTION OF BUSINESS—The fire policy will compensate an assured for loss resulting from inter- n of business or manufacture. Use and occupancy in- ce can be taken out to cover this risk. See Use and pancy.

TERTIE—Small pieces of timber placed horizontally en, and framed into vertical pieces to tie them together.

TRUST, is part of the Commission Clause which "His own or held by him **in trust**, or on commission nsignment, or on storage or for repairs, or sold but moved, or for which he may be liable." The intention cover the insured's interest in, and legal liability for rty, in whole or in part, belonging to others. It does natter whether the insured has assumed responsibility legally liable for property of others, if the above clause the policies, each owner of such property after a fire itled to a claim thereunder.

ASION—See Hazards Not Covered.

ERTED ARCHES are frequently built under open- n order to distribute the pressure more evenly over undation.

ERTED GAS-LIGHT mantles have caused many fires to the red-hot carbon dropping on combustible mate- Recommend placing a fine wire mesh below mantles.

ISIBLE HEAT—See Flames.

OICE—Account of merchandise shipped, with prices harges annexed.

IODIDE OF NITROGEN—A highly explosive blacl powder, used in combination with drugs.

IODIDES—As chlorine forms chlorides with many of th metals, so iodine forms iodides with them.

IODINE is produced mainly from crude Chile saltpeter Caliche and to some extent from the ashes of deep seawe It is bluish-black, lustrous crystalline, solid, slightly volat and sparingly soluble in cold water. Melts at about 114 d C. (238 deg. F.) and boils at about 184 deg. C. It is usu imported from South America in small hardwood k bound with iron hoops, covered with dried skins which said to be intended to keep the kegs from falling a should the destructive action of the contents on the w and metal weaken the keg to the point of collapse be the iodine is ready for use.

Owing to its great tendency to stain everything with w it or its vapor comes in contact it should not be store buldings containing other merchandise, unless it is o floor lower than those on which the other stocks are k

While not readily inflammable it burns when expose very high temperatures, giving off dense, suffocating, blac smoke, which would greatly hamper fire fighters. Ow to its low melting and boiling point it is considered susceptible to fire damage and in view of the ave weakened condition of the wood and metal containers, to its destructive chemical action, many would prob collapse if exposed to pressure from hose streams, expo their contents to ruin. When there is a very high cos Iodine it means congested values and lines should be wri sparingly.

Iodine Extract presents a better insurance propositio it is kept in bottles packed in wooden boxes.

IRON—**Cast Iron** has considerable carbon, **Wrought** has no carbon, **Steel** has about one per cent carbon. W an iron band or loop is first heated and then at once pl upon the body which it is intended to surround, it shr or contracts as it cools and thereby fits very tightly. melts at approximately 2768 deg. F.

***IRON BED* AND SPRING MANUFACTURING**—M

ly a machine shop hazard with drills, presses, rolls, stretching and special machines. Parts are sometimes dipped in black asphaltum or coated with aluminum or bronze paint. Excelsior pads are used for wrapping. The class has a poor fire record.

IRON BORINGS, TURNINGS AND FILINGS are more or less subject to spontaneous combustion when moist. Should be kept in metal receptacles. Sometimes called "swarf."

IRON CLAD—A frame wall sheathed with corrugated iron, replacing the clapboards.

IRON DUST—When damp and exposed to the air has been known to ignite spontaneously.

IRON FRONT BUILDINGS—If in rows are apt to have a hollow space back of the iron fronts. Fire is likely to travel from one building to another unless this concealed space is backed up with brick or other fire-resisting material.

IRON GRILLE—A lattice work or grating of iron usually of small dimensions. A grille enclosed elevator shaft is an open shaft. The fire prevention ordinance of many cities now require (in most instances) that this grille work be backed with wired glass as a method of fire protection.

IRON MASS—A mixture of wood shavings with hydrated ferric oxide. Used to remove sulphur from coal gas.

IRON MASS (SPENT)—Called spent-iron sponge. Is iron mass after saturation in gas purification. Subject to spontaneous combustion on exposure to air.

IRON MURIATE—Is formed by dissolving muriatic acid with iron scraps or filings. It is eager to take up oxygen from the air. Hydrogen is given off in the process.

IRON-ON-STUD WALL—Corrugated iron or sheet iron fastened directly on studding.

IRON PIPE STOCK—If in basement is likely to have considerable damage from water rusting the interior of the pipes. This does not apply to galvanized iron pipe. Lesson learned at fire in 35-7 Frankfort Street, New York City (1918),

IRON PYRITES—A chemical compound of iron and

sulphur. It is very prone to oxidation if damp. Not hazardous.

IRON RUST—Oxide of iron. Particles of iron moistened with oil have been known to ignite spontaneously.

ISINGLASS—Bladder of fishes. The better grade is made from the giant sturgeon of Russia. See Mica.

ISOLATED—A building is isolated when it stands alone with no other building in vicinity.

ISOMETRIC DRAWINGS—All vertical lines are 90 deg., while all other lines are 30 deg.

ISOPRENE—The raw product from which artificial rubber is produced.

ISTLE—A hard fibre of a tropical American plant, grown abundantly in Mexico. Used in brush making. See Fibres.

ITE—This ending means a saline compound and is formed by the acid ending with "ous". Thus sulphites are formed by sulphurous acid with bases, while sulphates are formed by sulphuric acid with the same bases.

IVORY BLACK—Made by burning or charring chips of elephant tusks and other hard bones free from fat.

IXTLE—Same as Istle.

J

:KETED—A means to prevent "direct" heating by g a steam, oil or water jacket around the kettle or receptacle containing the substance to be melted or l, thereby preventing such substances as glue, pitch ıx from overflowing onto the fire or preventing the eating of substances. Also an insulating covering on pipes. Oil is used in jackets at machines such as aves.

:KETS OR BOOTS FOR BOTTLES are made of or excelsior. The straw jackets are made of straw l with string so shaped as to snugly fit a bottle. Exr jackets (or pads) are made by wrapping a thin layer celsior with paper, the ends being left open. When as a packing material, they should be kept in a standard See Illustration, page 484.

:K-RAFTERS—Small rafters laid on the purlins of a for supporting the shingle laths.

:K SHAFT—Intermediate driving shafting. Usually ı by main shafting and drives the countershafting.

MBS—The sides of an opening through a wall, as door, ›w and fireplace jambs.

t T. WATERPROOF FILLER—Used for waterproof:ather. Non-inflammable.

PAN—A black varnish used on metal goods. Turpenlinseed oil and benzine are used as solvents.

PAN BLACK—A varnish made with tar and alcohol, mp-black and resins.

PAN DRYERS—Made of linseed oil and gum shellac :d in a varnish kettle. Litharge, burnt umber, sugar ıd and turpentine may be added. Naphtha and benzine be used, especially as a thinner. When cooked to a substance called a "pill" it is cooled and thinned.

Baked Black Japans, made of linseed oil and asphalt, copal resins, kauri gums and turpentine.

JAPAN AND ENAMEL OVENS—To be of all metal, double wall, with air space filled with insulating material; vented to the outer air and heated by steam or electricity. Direct fire heat is a serious hazard. If gas is used, the heat should be radiated through an all-sheet metal flooring between burners and lacquered goods to prevent the vapors in oven being ignited by exposed flames. Vent pipe and oven not to be near woodwork. An explosion of a Japan oven at 210-12 Canal St., New York City, in October, 1917, killed 8 people. The explosion was caused by allowing the vapors to come in contact with a naked flame inside the oven. See Dip Tanks.

JAPAN WAX—A solid wax extracted from the berries of the Japanese lacquer tree. Melting point 120-125 deg. F.

JAPANESE MUSTARD SEED OIL—A by-product in the manufacture of mustard.

JAPANNING—One of the hazardous features to be found in most metal working and similar manufacturing risks. All japanning (especially dipping) if at all extensive should be done in a separate fireproof section, with a standard automatic fire door at the opening. As the vapor is explosive, no open lights or open flames of any kind should be allowed in the room. Only vapor proof electric light globes should be employed and electric switch boxes should be outside of room. If only a little hand brush work is done, no open light should be within at least 25 feet of the japanning bench. The vapor of japan has been known to travel as far as 100 feet to an open flame and cause a serious flare up.

JET—An inflammable bituminous variety of coal or lignite.

JEWELERS use benzine for watch and clock cleaning, by dipping the mechanism in an open dish of the liquid. They use cyanide sodium and nitric acid for testing gold. This is mixed in certain proportions to ascertain the carat of the metal according to the standard.

JEWELRY—Novelty jewelry is mostly imitation ware, such as imitation pearl (glass), pins and trinkets. Shops use

blow-pipes, small metal working machines, gas or elec- heated dry-boxes, lacquer and celluloid-enamel.

[JE]WELRY BOXES—Usually wood or cardboard boxes lined with cotton pads and covered with silk or leather, [eith]er plain, printed or embossed. Hazards are light wood[wor]king, cotton pads, sewing, printing and embossing, also [stoc]k of celluloid toilet articles. Accommodation business.

[JE]WELERS' PUTTY—An oxide of tin.

[JE]WELRY FINDINGS—Unassembled parts of an article [of j]ewelry, finished or unfinished. They are usually kept in [fire-]resistive safes. Good insurance.

[JE]W'S PITCH—Is a form of asphalt.

[JI]GS (in use at smelters)—Consist of wooden boxes con[tain]ing a shaker with perforated iron bottom, which is [desig]ned to allow the ore to pass by gravity from one shaker [to a]nother. They act as graders.

[JI]G SAW—A very narrow thin saw worked vertically by [mac]hinery and used for sawing curved ornaments in boards. [Jig]gs up and down.

[JO]B PRESSES—See Printing Hazards.

[JO]BBERS—Their method of conducting business differs [in v]arious lines. They can be classified as speculative whole[sale]rs and are the middlemen between the mill or mill agent [and] the retailer or small manufacturer. For instance, a job[ber] in piece goods, silks, woolens or cotton, buys direct from [the] "mill agent" or commission merchant, on say a 30-day [term]s, or buys up small lots or "jobs" for cash. In turn he [sells] to the small manufacturer or retailer whose business is [too] small to be recognized by the "mill agent," on a longer [credi]t basis and in smaller lots as desired. For this accom[mod]ation, the buyer is willing to pay an advanced price [for] the goods, of say 5 to 10 per cent. which represents the [jobb]er's profit. Some jobbers take advantage of a manu[fact]urer's temporary financial embarrassment and offer him [a lo]w figure on a cash basis for his product. For instance, [in th]e cloak and suit line, a manufacturer may need some [read]y money to meet a note before his garments can be [mark]eted in the regular way. A jobber may buy the garments [for c]ash at a figure which would permit him to resell to a

retailer or wholesaler at less than they could ordinarily buy direct from the manufacturer, and still make a profit for himself.

JOHNATHAN—A spurious fodder used for adulterating provender; made of rice husks. In ground state it is very hazardous.

JOHNITE—Contains nitrates, chlorates and picrate of soda. Powerful explosive.

JOINTERS—Woodworking machines used to make a true surface or edge for gluing, also for trueing up smoothly, chamfering and beveling. Similar to planers except without feed rolls, the work being held against cutters by hand, producing a great deal of refuse. Cylinder head rotates rapidly and is liable to overheat bearings unless clean and properly aligned.

JOIST—A beam set on edge to which the flooring is fastened.

JOURNAL—The end or other part of shaft which rests on or against a bearing and supporting the ends of a horizontal revolving shaft.

JOURNAL ALARM—Consists of a thermostat screwed into journals or shafting. In grain elevators they are required on every bearing. The thermostat is usually set to give an alarm at 165 deg. F. When the journal reaches this temperature, the thermostat assumes the same temperature and rings in the alarm to the engine room.

JOURNAL BOX—An enclosure for a journal bearing.

JUNK SHOPS—While of one general class, may be subdivided into classes such as those who carry all metal, metal and rubber, or those who include paper and rags. Sometimes used as a "fence" for stolen goods, and frequently as "hangouts." Very poor fire risks. Serious exposure to surrounding properties.

JUTE is bleached by exposing the fibre to the action of permanganates and then sulphuric acid. See Fibres.

JUTE RISKS—Raw stock consists of hemp, istle, jute, sisal, old burlap, tar, mineral oil, starch, borax, soda, tampica, talc and ammonia. Process consists of opening, picking, *lapping, carding,* roving, drawing, twisting, spinning, rope

preparing by laying, coloring, tarring, polishing, weaving, calendering and honking. This class has a very poor fire record and should be written with extreme care. It is a serious exposure, because it burns with heavy dark smoke and is hard to extinguish. The jute in the Seaboard warehouse, 435-41 East 48th Street, which burned Feb. 17, 1919, absorbed so much water that the heavy brick rear wall was pushed out 8 to 40 inches, and also displaced 2 of the heavy cast iron columns.

JUTE SHODDY is made by macerating burlap bags, sacks, etc. See Hemp.

K

KAIMT—Composed of water, sulphuric acid and chlorine.

KAKODYL—A heavy fuming liquor composed of carbon, hydrogen and arsenic which takes fire when in contact with air.

KALAMEIN DOOR—A metal-clad door, the metal being in large sheets pressed over the wood door. Unless "Labelled" not considered very good in case of fire.

KALAMEIN DOOR MANUFACTURING—Metal and woodworking hazards. The metal is placed over the wood and power saws then cut through metal and wood, sometimes causing sparks to drop into the oil-soaked sawdust under the saw table. Quick burners. Poor fire risks.

KALAMEIN IRON is a trade name for open hearth sheet steel covered with a thin alloy of tin and lead.

Kalameined Wood—Is wood sheathed with sheet metal. It is used for doors, windows sash and frames and interior trim. Unless "Labelled," not considered standard.

KALSOMINE—A sort of lime or whiting used to coat walls.

KAPOK OR COPAC—A cotton or silky non-absorbent fibre covering the seeds of a tropical tree found in the East and West Indies. It is a substitute for hair and cotton and used for pillows, mattresses, life preservers and linings for aviators' coats. It costs more than cotton but can be renovated simply by steaming. When loose it burns very rapidly and heat expands it. Not subject to spontaneous combustion. Classed as a fibre. Sometimes called "Silk Floss."

KAURI GUM—An exudation from a foreign pine tree which burns very readily. Used in varnish making.

KELHEIM STONE—Secured from Bavaria. Used for *lithographing.*

LP is the ash of the giant seaweed from the Pacific 1. Formerly the source of soda, also used in glass soap making and in the manufacture of numerous icals.

ROSENE BURNERS—Specifications for the Tempo- Installation of Small Kerosene Burners for Emergency n Fire Boxes of Cooking Stoves, Heating Stoves, Fur- and boilers—Permission may be granted for the tem- y use only as an emergency measure of special burn- stoves and furnaces as a substitute for coal or other

: capacity of gravity tanks containing kerosene shall xceed 2 gallons for stoves and 5 gallons for boilers or :es. The tanks should preferably be located outside lding; if inside, they shall not be within 5 feet measured ›ntally from any fire or flame. Pressure tanks shall cceed 10 gallons total capacity (air and kerosene), and de shall not be within 10 feet measured horizontally of re or flame.

ks for kerosene shall be constructed of galvanized iron or steel; all joints to be riveted and soldered or tight by some equally satisfactory process. The shell ık shall be properly reinforced where connections are The tanks shall be sufficiently strong to bear without the most severe strain to which they are likely to be ted in practice. Tanks for systems under pressure ›e designed for six times the maximum working pres- .nd tested for twice the maximum working pressure.

vity tanks shall be readily accessible for filling, and t in a drip pan constructed of galvanized sheet iron el, with joints riveted and soldered or made tight by equally satisfactory process. The tank and pan shall ›ported on a shelf rigidly secured to wall or partition. rip pan shall be at least two inches deep and extend nches beyond tank at sides and front. The wall or on back of tank shall be covered with sheet metal, shall extend four inches beyond the sides and twelve above tanks; the sheet metal shall also overlap the f and extend to bottom of pan.

Each pressure tank shall be set in a drip pan on the floor at a safe location and protected from injury. The tanks shall be placed in a pan two inches deep and extend at least four inches beyond the tank on all sides.

A drip pan capable of holding the full capacity of supply tank shall be placed below oil burner.

Piping—Standard, full-weight wrought-iron or steel or brass pipe with substantial iron or brass fittings shall be used and connections made tight with well-fitted joints. Piping to be run as directly as possible and be protected against injury. Systems under pressure to be designed for six times the maximum working pressure, and installation, when complete, to be tested to twice the working pressure.

Any storage of oil outside of a buried tank shall be limited to 60 gallons in an oil barrel or its equivalent.

A shut-off valve should be placed in the pipe line as near as possible to oil receptacle and one near burner. (Recommendations of New York Board of Fire Underwriters.)

KEROSENE OIL—A petroleum distillate; flash point about 115-125 deg. F. **The standard policy permits the storage of five barrels.** See Mineral Burning Oil.

KEROSENE OIL STOVES or lamps should not be filled while lighted, or even when hot. A special metal clad room without lights should be used where oil lamps are filled.

KETONE—Chemical group, sometimes called acetones.

KEYSTONE—The center stone in an arch.

KID GLOVES—Not considered attractive stocks because only a slight moisture will class the stock as seconds.

KILLED ACID is made by adding an excess of zinc or other metal to an acid. Hydrogen is given off in the process. Should only be done outdoors as the process is very hazardous.

KILNING is merely drying on a large scale. Inspectors should note construction of side walls, roofs and floors, and whether cut off in separate building or communicating. The heat used is preferably steam or hot air; if the latter, fan and motor should be carefully inspected. Pipes should be preferably above or at the sides of the material to be dried, *not below, on* account of the light material falling on the

pipes and being ignited. Steam jets can be used to advantage to extinguish fires in kilns. See Dry Kilns.

KILOWATT—A thousand watts. A watt is the electrical unit of power, being the product of one volt by one ampere; 746 watts equal one horse-power. K. W. is the abbreviation. See Electrical Terms.

KINDLING WOOD FACTORIES use heavy wood-working machinery, chiefly cross-cut saws. Generally crowded, and untidy with loose bark. Usually occupy old buildings and employ cheap labor. Dry kilns have been the cause of many fires. Not considered as good as ordinary wood-workers.

KINETITE—High explosive. Said to be subject to spontaneous combustion.

KING POST—The center post, or rod, extending vertically from the collar beam to the ridge board. All those on each side of it are queen posts or rods.

KIPS are the hides of young animals. See Hides.

KIRKER-BENDER SPIRAL FIRE ESCAPE consists of spiral slide incased in a cylinder six feet in diameter. Entrance is by a passage from each floor to the tower. Persons slide to the foot of the tower on the spiral incline.

KISH—See Graphite and Plumbago.

KITCHEN RANGES—When the kitchen range is placed eighteen inches from a wood, lath-and-plaster or stud partition, partition must be shielded with metal extending from the floor to three feet above the range. See Stoves; also Ranges.

KNEE—A piece of timber bent to receive some weight, or to relieve a strain.

KNIT GOODS are very likely to be stained by smoke; will shrink if wet; if colored, the colors are apt to run. In manufacturing, the year is divided into two seasons, the first six months for the making of sweaters, the last for the making of bathing suits and other articles. Susceptible stock. The fire record is only fair.

KNITTING MILLS are mills making sweaters or knit goods. Process consists of washing, dyeing, picking, cutting, finishing, carding, spinning, knitting and drying. The hazards

of the picker room consist of the light, inflammable stock, sometimes containing foreign matter, passng through high-speed machines. A full-fledged picker room contains a burr picker, mixing picker and duster, and lappers which discharge the stock after it passes through them into the gauze or blow room. The card room: After the raw stock is cleaned and mixed in the picker room it is transferred to the cards, which lay the fibre straight and form it into a loose roving preparatory to spinning process. The main hazard in card rooms is the presence of foreign matter in stock, which emit sparks when coming in contact with the rolls of cards. The other processes present only mild hazards. Always remember the higher the grade of the output the better the risk. Avoid the mill with a low-grade cotton and cotton waste, especially if the picker room is not properly cut off and the card room is over the finishing room. The fire record (unsprinklered) is not very good.—R. G. Potter.

KNOCK-DOWN—Parts of an object before assembling, as chairs in knock-down condition.

KNOWLEDGE OR CONTROL OF THIS INSURED—Oftentimes the assured or his representative will hesitate to accept a policy on account of some condition which he feels may possibly be violated by some other tenant in the building, therefore a policy may be secured reading, "This insurance shall not be invalidated by the act or neglect of any other occupant of the within described premises, providing such act or neglect is not within the knowledge or control of this insured."

K. O.—A term used by insurance men to denote a poor risk. Means "Keep off."—Gene Eagles.

KOHOLIA—A form of alcohol used as a fuel for heating in place of small portable gas or oil stoves.

KOLORENE—A straw hat dye. Flash point about 90° F.

KORG—A resinous deposit left in steam vats in preparing cod liver oil. Used as a fertilizer.

KUT-KOTE—A varnish remover. Classed as inflammable.

K. W.—Abbreviation for Kilowatt.

KYANISING—A secret process for preserving lumber. See Creosoting.

L

BEL—Reference to label or labelled means doors or devices bearing the label of approval issued by the writers' Laboratories. (See Underwriters' Laborato-

BELLED GOODS—See Canned Goods.

BEL MANUFACTURING—The sheet of paper is first d or lithographed with the name or trade mark of in columns. The paper is then varnished on face nd gummed on reverse side. The individual labels are t on a press by placing a hollow die which just fits over esign. Sometimes an ordinary paper cutter is used. umming and varnishing machines are similar except he glue pot on the gumming machine is steam or gas l. The sheet of paper is placed on an endless cloth ıd is drawn between 2 rollers, one of which revolves in gh of varnish or glue which coats one side. The belt carries the paper through a metal drying box under iling and is removed at the opposite side of the room. arnish is thinned with glycerine, alcohol and benzine. cloth belt becomes wet (as from a disrupted sprinkler or hose stream), wrinkles are made which makes the slide off, and becomes useless. The trough containing ırnish should have a heavy hinged cover arranged to automatically in case of fire. Quick burner.

BELS—An obsolete stock is a serious feature from a hazard standpoint.

BORATORIES—Work of an experimental nature is to have dangerous features. In colleges, fires have been l by young students experimenting. All such laborato- hould be cut-off from the balance of the building in a rd manner. Poor fire record. See Chemical Laborato-

LACE CURTAINS—Cleaners and dyers use nitrate of iron, permanganate of potash, sulphuric acid and benzine. The dry room is the main hazard.

LACE PAPER WORKS—The lace paper is perforated in revolving machines, then sized or varnished. The perforating dies are mostly hand-made and many are imported. It takes from one to three months to engrave a large die, some of which are two feet long and cylindrical in shape. Dies should be kept in vaults. All scrap paper should be baled daily. Use and Occupancy insurance should be written with caution. Very susceptible stock. Fair insurance risks.

LACE WORKS—The hazards are weaving, sewing, knitting, twisting, bobbin-winding, sizing, silk-throwing, embroidering, lace-making, dyeing and drying. In dyeing use muriatic, acetic and sulphuric acids. For sizing, use glycerine, gelatine, gum arabic and starch, and these are heated in steam or gas-heated kettles. Goods are bleached with chloride of lime and caustic soda. At times they do considerable repair work and use benzine and alcohol for removing stains, and gas or electric irons for pressing. The needle lead pot is gas-heated. Machine repair shop work is extensive in most plants. Imported machinery forms a large proportion of value. White laces are "dry dyed" by refinishers, who place them in wooden tumblers containing a yellow powder called "Dutch white," which turns the laces a creamy white. Expensive silks should be kept in vaults. Fair insurance risks.

Laces in some cases will be almost unimpaired after a serious clean-water damage if they are what is known as wash laces; but fancy laces will not, as a rule, give near as much salvage.

LACQUER FLASHES at about 75 deg. F. It usually consists of nitro-cellulose dissolved in volatile solvents. The preparation, storage and manufacture is very hazardous. Lacquer should not be stored in large quantities. Classed as inflammable. See Dry Rooms.

LACQUER FIRES—Sawdust, if spread over the surface in sufficient quantity will readily and successfully extinguish fires of inflammable liquids, especially lacquer. When con-

ained in moderate-sized tanks, such as those ordinarily used
ı manufacturing plants, or small fires in these liquids on
ıe floor the above is very effective. The efficiency of the
ıwdust is undoubtedly due to its blanketing action in
oating for a time upon the surface of the liquid, thereby
xcluding the oxygen of the air. The sawdust itself is not
ery easily ignited, and when it does become ignited it burns
ithout flame. The burning embers are not sufficient to
ignite the lacquer. In sixteen fire tests the fire was put
ut in from 11 seconds to 1 minute 55 seconds. See Dip
anks.

LACQUERING—A very hazardous process, done by air-
rush, dipping, or by hand brush. No open light or flame
ıould be allowed in the same room where this work is done.
acquering room should be properly cut off. Fire usually
arts where this work is carried on.

LACQUER SHELLAC is a mixture of shellac and lac-
uer. Inflammable.

LACTEIN—See Casein.

LACTERINE—Is casein prepared as a mordant.

LADIES' FURNISHINGS, if not kept in cardboard boxes
in cases, will suffer severe damage from smoke and water.
onsidered no better than millinery.

LADIES' TAILORS are in the same class as dressmakers.
hey make suits, coats and skirts for individual customers.
se gas irons for pressing and benzine for cleaning. Good
surance if well established.

LAGGING—A covering of loose plank, as that placed upon
nters and supporting arch stones.

Lagging—A covering of felt or other poor conductor of
eat applied to steam boilers, pipes, etc., to prevent radia-
on.

LALLY COLUMN consists of a steel outer shell filled
ith concrete under hydraulic pressure. Some rating bureaus
quire an outside insulation of from two to four inches of
ncrete or tile.

LAMP-BLACK—A kind of soot made by letting the smoke
burning substances, such as oil, pitch or rosin, collect in a

chamber lined with leather. If moist it is subject to spontaneous combustion. See Carbon Black.

LAMP EXPLOSIONS—Many of these may be prevented by trimming the wick daily. When burned for several evenings without trimming, the wick becomes black, clogged and incapable of supplying the oil clearly and uniformly, and the chimneys are sometimes filled with flame and smoke, to the embarrassment and alarm of those present. Some explosions would be prevented by never extinguishing the lamp by blowing down the chimney; for if the wick happens to be too small, the flame may be driven down into the oil. The best way is to turn it down with the button until it is extinguished.

LAMPS smoke when the wick is too high because of insufficient oxygen. Smoke is made up of little particles of carbon, because oil as well as wood contains carbon. It smokes because more oil rises in the wick than can unite with the oxygen supplied, making an imperfect combustion.

LAMP SHADES of celluloid or paper should not be placed on electric lamps or bulbs. Those made of fabric, paper, etc., as sold by department and 5 and 10c stores are daily increasing the fire hazard of the home. When placed on a naked electric light bulb the chances are they will ignite from the heat. Most rating organizations charge for their presence. Many bad fires have been caused by these flimsy articles.

LANTERN SKYLIGHT—Similar to monitor. A raised roof with glass sides, usually extending the entire length of a building.

LAPPER—A machine which combs out or cleans the stock, passing it over a wire mesh cylinder, and laying it in the form of a lap.

LARD OIL—Obtained by pressing hog's lard. It is used largely as a lubricant for machinery and for light in watchmen's lanterns. It may be subject to spontaneous combustion.

LASH LINE (in theatres)—An ordinary hempen cord attached to the bottom of counterweights of theatre curtains, continuing down each side of procenium arch then under stage then over the top of the counterweight. A

'e is hung alongside of the rope. If this cord is cut or nt on either side of stage, curtain will descend.

ATHE—A machine for shaping wood or metal parts by sing them to revolve while acted upon by a cutting tool l in place by a slide rest.

ATTICE GIRDER—A type of girder in which the web nade up of diagonal iron or steel bars, which form a lat- between the flanges.

AUGHING GAS—Is nitrous oxide. Used by dentists.

AUNDRIES (Chinese)—A class to be avoided. The haz- s are swinging gas brackets, coal stoves of laundry type, h clothing hanging over and around them; improvised dry ms, gas bosom ironers with rubber tube connections, gas ıs, gas and coal stoves for heating irons.

AUNDRIES (Collar, Cuff and Starched Goods)—Wash- drums are revolving wood cylinders into which the goods placed for washing. The goods are dried in centrifugal ractors, then starched and ironed. Starch kettles are either ım or gas-heated. Dry rooms are usually metal-lined and ım-heated, having an iron track on which a rack of wet ıds travels which is pulled in and out on the tracks. Some ers have an overhead traveling track with a rack, to ich the goods are hung and dried by the traveler passing wly through. Dryers should have wire mesh over steam- ing to prevent goods coming in contact. There is less t and lint in this class of laundry than in those doing eral work. **Ironers (called mangles)** are large steel rollers, h-covered and gas-heated. Gas mufflers are used for d-irons. "Tipping" machines are used to finish off the ıts of collars and are gas-heated. Fair insurance if haz- s are safeguarded.

aundries (Power)—Process consists of washing, rough- ng by wringing, and drying in centrifugal extractors, ching, ironing, and drying in dry rooms. There are spe- gas-heated ironers, such as "art edge" ironers and ulding ironers" for turn-down collars. The old style ron is only used in the small store laundries. If used should be set on a solid iron stand at least 18 inches ı all woodwork. If the plant machinery is all steam

process and the boiler is cut-off in a standard manner and the building is of fair construction it should be a desirable risk. Only write a small line on the stock, which is equivalent to second-hand stock.

LAUNDRY STOVES—The rule for setting is the same as for hotel ranges. When set on legs, two courses of four-inch tile are required.

LAURING—See Hats (felt).

LAW—A knowledge of Insurance Law will be found very beneficial to an insurance man, as it would then enable him to properly understand the policy conditions and the many perplexing legal problems which constantly arise.

LEACHES—Materials through which liquids pass, carrying away soluble portions.

LEAD—Derived principally from an ore called galena and has a bluish gray color. It oxidizes or tarnishes easily and melts at 620 deg. F.

LEAD CHROMATE—See Chrome Yellow.

LEAD DROSS—Material skimmed from the surface of molten lead. When cold it is non-hazardous.

LEAD NITRATE—A white, heavy, translucent salt. Not an oxidizing material.

LEAKAGE IN WATER PIPE (Pinhole in Water Pipe)—Information recently circulated by the water department of a small municipality where meters are used shows the importance of discovering and mending leaks that may occur in a piping system. Under a pressure of 40 pounds it is estimated that, in 24 hours, 170 gallons of water will pass through a hole a shade larger than the period at the end of this sentence. An orifice slightly bigger than the head of a pin will permit 3600 gallons to escape in a similar length of time. Thus, ever so slight a hole may cause the wastage of a great volume of water if it fails to receive immediate attention. It is easy to test a plumbing system and ascertain its condition. This may be done by closing all cocks and the reading meter. If, after a half hour, the meter reads the same as originally, the pipes are free from leaks.—Popular Mechanics Magazine.

LEASE is a contract for the use of a building for a year

or term of years. If the terms of the lease are complied with, the lessee is virtually the owner during the term mentioned in the contract. A lease is a valuable holding, therefore the lessee should provide for indemnity in case the building is destroyed by fire.

There are two forms of leases. First, value of a lease, where the building is occupied by the lessee. Second, profits of a lease, where the lessee sublets the building to make a profit. See Leases; see Leasehold Insurance.

LEASED LAND—According to the policy conditions, insurance is null and void if a building stands on leased land unless agreed to by the insurance company. Therefore it is necessary to have a privilege on the policy to cover this condition. A moral hazard is involved in cases where buildings stand on lands the leases of which are expiring and cannot be renewed.

LEASES with the "self-reducing" clause are commonly written and the premium is obtained in the following manner: Policy written for eleven years for the full amount of $110,000, the tenth year for $100,000, and so on to the first year, $10,000, which added together, equals $660,000, divided by 11 years, equals $60,000, and the premium is figured on the $60,000 amount, but in case of loss the first year, assured could collect $110,000, the second year $100,000, and so on, deducting $10,000 for each year the lease has to run. It is also customary to write this insurance specifying so much reduction per month. In this case the premium may be computed upon an amount representing the average between the policy amount at the beginning of the first month and at the beginning of the last month of its term. See Leasehold Insurance; see Fire Clauses.

LEASEHOLD INSURANCE—This class of insurance should be written cautiously. The first and foremost thing to be considered is the fire clause which is embodied in almost every lease. This clause varies in a great many instances and has a direct effect or bearing on the loss adjustment. The lease should be carefully scrutinized by the underwriter to ascertain what restrictions are included, as for instance "building is *not to* be used for a certain class of

business or tenant." The neighborhood may change and property could not be leased for same purpose making leasehold insurance very undesirable. Be sure the lessee has a good bargain. An assured may take a building during prosperous times and later be losing money in consequence of change of trade.

The best form of leasehold insurance from the companies standpoint is where the conditions of the lease call for a total destruction of the building before the owner can elect to cancel the lease. Under a valued form, when it is optional with the lessee or owner to cancel lease, the proposition is a poor one. In this latter case the building may suffer a small damage and the lessee or owner decide not to rebuild in which case the insurance company would be forced to pay a total loss up to the amount of the policy.

If no fire clause appears in the lease it would be acceptable, as, under common law, the lease could not be terminated unless the building is totally destroyed by fire. There are a number of insurable interests on the part of a lessee. He may have paid full rental in advance with no right of abatement, or he may have obligated himself to pay rent during the entire term of lease even though the premises should be destroyed by fire. He may occupy the demised premises himself and owing to an advance in the value of the leasehold interest he may take out insurance to cover this increased value. (John L. Seeber.) See Value of Lease; also Profits of a Lease.

LEATHER—A skin is cut into three thicknesses. The top is the "**skiver**" or grain, the middle is the "**splits**" and the bottom the "**flesher.**"

Leather—If wet it cannot be artificially dried with success. Unless dried slowly by atmospherical heat, the "life" of the leather is lost.

The wholesale leather dealers term **fancy leather,** any leather used by the bag, case, strap, belt, trunk and novelty trade. The word fancy is used in quoting trade prices; in such cases it refers to colors.

One cannot strictly determine the limits of fancy leather, *as ordinary* leather is used by the bag, etc., trade, and in

h cases comes in the fancy class. Pigskin used by a nessmaker is only pigskin, but if used in the bag, etc., le, it is fancy leather.

nsurance underwriters usually put all kinds of leather in fancy leather class, except sole and harness, yet some e put the latter in this class, especially if highly finished of light weight. They would possibly be correct, from insurance standpoint, or at least be on the safe side, to s all leather as fancy, except sole and harness. Probably latter is less subject to damage.

eather (Finishing)—Received at tanneries in dry state, ced in water and in lime pits (called beam house), washed n in water, the water squeezed out by "putting-out" ma-es, dried, "staked," and "seasoned" by use of ammonia albumen, tanned, dried (usually by fan drawing heat n steam coils), softened by machinery, ironed, dressed waxed. If raw hides are received they are "fleshed" and naired," i. e., the hair and flesh adhering to the hide is oved. Tanning and finishing vary for different kinds and ities of leather. There may be used gambia, sumac, tan-:, chrome, neat's-foot oil, soap, salt, sulphuric acid, aniline ogwood dyes. A profitable class with most companies. Celluloid (Imitation Leather); also Imitation Leather Patent Leather.—T. O. Gildersleeve.

eather is now being made from the skin of the shark, oise, cod and tuna fish. It is said to be as durable as r leathers and can be used in making shoes. Porpoise has been used for razor strops for some time.

EATHER BELTING MANUFACTURING—Leather re-ed in hides, run through a shaver to remove rough sur-s, then soaked in water, hung to dry overnight (some-s use tumblers and wringers). Leather is fastened to an frame and dipped in melted tallow for about three utes and allowed to dry in a dry room with about 120 F. heat. Then dipped in a solution of soda and water, owing which it is given a bath in a solution of sulphuric and water (a very weak solution). Hides are then red in a scouring machine which removes all rough s. Next leather is placed in a compress machine which

flattens and softens, then stretched on wood planks with vice and blocks. Leather is then placed in a kicker which makes it very pliable, is then trimmed of rough edges, is cut to proper width by cutting machines and ends are skived to make ready for piecing. Hot glue is used for piecing all except those used in damp places where a waterproof cement is used. After glueing leather is clamped so as to set the glue and is rolled ready for delivery. Some leathers are given an oil bath when finished to make them waterproof.

Hazards are collecting of leather findings and dust under shavers, scourers, skivers and cutting machines, tallow tank heating and setting, tallow room enclosure, heating of waterproofing oil bath (should be steam), gas heated glue pots, gas engines for power, storage of sulphuric acid and waterproof cement. Sometimes a barrel or more of this cement which is nothing more than a celluloid lacquer is on the premises and used in close proximity to open flames. At times the cement is made on the premises by adding acetone to chip or sheet celluloid. This makes a thick jelly like colorless paste. Fair insurance if hazards safeguarded. See Tallow Rooms and Tallow Dipping.

LEATHER BELTS (live leather)—Consists of rubberizing leather by skiving same and cutting them into lengths and then cementing them together with rubber cement. Poor class.

LEATHER CEMENT is a solution of rubber in gasoline or carbon bisulphide. Flashes at zero F. Very inflammable.

LEATHER DECORATORS do painting, embossing, staining, sewing and cutting. Use amyl acetate, japan, lacquer, turpentine and benzine. Coloring is usually done by airbrush (spray). Write this class cautiously.

LEATHER DOG-COLLARS—Work consists of cutting, splitting, skiving, creasing (creasers, gas-heated), eyeletting and riveting machines for brass ornaments, cementing with rubber cement, shellacing, varnishing and buffing metal parts. Fair insurance risks.

LEATHER DUST is attributed as the cause of a fire in a shoe factory recently. Rapidly revolving drums covered with emery or sandpaper produce a fine dust; also a good deal of

int was made by the cloth-covered buffing wheels. The fire 'as possibly caused by sparks from the machines. After the re the floor was dotted all over with lumps of glowing dust :sembling lumps of incandescent charcoal. These balls or umps could be picked up without falling apart, when handled ently.—Fire Chief Soule, Coatesville, Pa.

LEATHER FINISHERS—Some bag makers use alcohol, :etone, benzine, shellac, linseed oil, glycerine, lampblack and rpentine. Inspect and write carefully.

LEATHER LININGS—Bag linings are the inner side of lit sheep skins, called "skives"; usually tanned with sumac, ed with anilines, tacked on boards to stretch, softened her by hand or power machines. Before tacking they are icked up" to remove all loose or rough surfaces by laying ne on a glass washboard and being scraped with a knife. aining is done in a machine similar to a mangle, having a per roller with indentations, heated by steam over which skin is rolled.

.EATHER MANUFACTURING (Not Patent) with dull sh. The skins are received in a dry state, then soaked in :er and later placed in lime pits (beam house). They are n washed in water and followed by the tanning process e chrome, neat's-foot oil, soap, salt and sulphuric acid), ored with dye stuffs, dried (usually by fan drawing heat m steam coils) and finally put through various machine :rations merely to soften the leather then ironed and xed. (Fair insurance risks.)

.EATHER (PATENT)—In making the varnish for the :ent leather, linseed oil is heated by wood or coke fires about 580 deg. F. The temperature of the oil is lowered open air to about 250 deg. F. and then thinned or reduced h naphtha and turpentine, which are slowly added. Fires 'e occurred in this process, due probably to adding the htha and turpentine before the oil is properly cooled. The .ub" consists of linseed oil, lampblack and benzine. rce burners. (A. Adamson.)

.EATHER SCRAPS and remnants from factories are d for fertilizer by reducing same to a pulp and extracting

the animal ammonia. Leather remnants burn very slowly, in fact in bags they have stopped the progress of fire.

Goods of this character are not an attractive salvage proposition at best and in this case the difficulty of recovering them (owing to the collapse of floors) entail an unusual expense. Market at present flooded with this stock. Lesson learned at fire 35-7 Frankfort Street, N. Y. C., Sept. 21st, 1918.

LEATHER SOFTENERS may contain inflammables.

LEATHER (SOLE)—Will easily stain from water to such an extent that the spots cannot be removed. Considered good insurance.

LEATHER—(TRADE NAMES) for leather substitutes, Leathertex, Neolin, Textan, Keratol, Fabrikoid, Texoderm, Pantosote.

LEATHER (TRANSPARENT)—Manufacturing—Ordinary skins are shaved, cleaned, stretched on frames and rubbed with glycerine, salicylic, picric and boric acids. Fair insurance risks.

LEDGE—Narrow shelf formed where a wall increases in thickness.

LEERS—See Lehrs.

LEGAL LIABILITY—The purpose of this insurance is to indemnify the insured for their "legal liability," if any, to the amount they are obliged to pay by reason of loss or damage by fire. This class of insurance is usually sought by Railroad and Steamship Companies, forwarders, freighters and warehousemen.

Two forms of policy for common carriers are in general use by the Fire Companies—"Legal Liability Disclaimed" and "Legal Liability Not Disclaimed."

The one expressly declares that liability for loss or damage by fire is and will be disclaimed in bills of lading, shipping receipts or other similar documents. In the other form, insurance is limited to the insured's legal liability as provided under the Bill of Lading Act, approved by the Interstate Commerce Commission, June 27, 1908.

Prior to 1908, bills of lading usually contained provisions exempting carriers from loss by fire. This waiver, however,

id not relieve the Railroad Companies from their liability : same was caused through their negligence. All courts, as ar back as 1863, held that a stipulation on a receipt exempt-ng a common carrier from liability from "any loss or dam-ge by fire," does not relieve such Company when such loss ccurred through its negligence."

A good deal of litigation was involved in determining just hat constituted negligence on the part of the railroad. In 908 a new uniform bill of lading was adopted by the Inter-tate Commerce Commission, which makes a Railroad or teamship Company an absolute insurer from the time it ssues a bill of lading until forty-eight hours (exclusive of undays and Holidays) after notice of the arrival of the roperty at destination.

The Federal Interstate Commerce Act does not prevent a arrier from exempting itself from liability for loss of goods y fire (not attributable to its negligence) but only in a few istances do carriers deny this liability in their shipping lanks.

Other bailees, such as laundrymen, tailors or jewelers, eldom assume responsibility for goods left in their custody, or, if any legal liability existed it could be included in the held in trust" clause in their policies covering stock.

Legal Liability insurance contains so many uncertain fea-ures that this form of insurance is not usually sought by nsurance Companies. The Underwriter is never certain ust what interests it protects. Owing to the almost con-tant movement of merchandise there is no possible way of etermining the amount of risk, and therefore no practical ray of applying an average or coinsurance clause. Further-nore, the experience in adjustments of losses has been ather unfortunate in this class.—J. Seeber.

Legal Liability Forms are sometimes written for express-ien as follows: $.... on their legal liability in, or for all ierchandise and for baggage held in their custody as com-ion carriers, warehousemen, forwarders or freighters. It eing mutually understood and agreed that if claim is made gainst the assured hereinunder for merchandise or baggage eld by them, the insurers shall have the option of either

admitting such claim for payment, or if resisting it in the court, the legal expenses incurred in such resistance to be borne by the insurance companies interested, in the proportion that the total amount of insurance shall bear to the total amount of such claim or claims. Only competent underwriters should accept "Legal Liability" insurance.

LEHRS OR LEERS (tempering furnace) in glassworks have a solid brick wall at sides and a flat brick-arched top. They are either coke or gas-heated. The hot ware from the glassblowers is placed on iron trays at the receiving end and then slowly propelled through the length of the lehr on a traveling belt.

LEMON OIL—Composed of lemon grass and paraffine; used by piano polishers.

LEPTYNE—A substitute for turpentine in thinning paint or varnish. Classified same as turpentine. Flashes at 99 deg. F. Fire test, 120 deg. F.

LETTERING—Good lettering is an asset to an insurance inspector or engineer, in that it enables him to make a plan which is easily read.

LIABILITY—Where a tenant occupies a number of floors in a fireproof building with fair cut-offs between floors, the usual practice is to carry the full line authorized for one floor and a half line on each of the additional floors. This same rule applies to a row of well-constructed ordinary brick buildings with heavy floors and standard floor openings.

Liability—Sometimes a line of insurance is offered in the following manner: What part of $100,000 do you want on a schedule covering as follows: $75,000 on Bldg. A, $10,000 on Bldg. B, $40,000 on Bldg. C, $30,000 on Bldg. D, $10,000 on Bldg. E, and $5,000 on Bldg. F. Look up each building separately, making line for each. Suppose you are then open for the full amount on Buildings B, C, D, E and F, but on Building A we find that this building is the poorest of the group, and we are only open for a gross line of $15,000, therefore we are only open for 20 per cent of the entire schedule offered, or $34,000.

Liability—Should a large schedule of insurance be presented covering many locations, as for instance:

Pier 41	$121,000
Pier 68	$ 70,000
Pier 22	$125,000
Hoboken piers	$375,000
Pier 11	$ 20,000

First review schedule for the largest item, i. e. ($375,000), then decide how much you can carry in the office; for instance, $4,750 net plus other companies and treaties in office, making say $11,250 gross, then divide 375,000 into $11,250, which shows you can take 3 per cent of schedule offered.

Placer offers line of $100,000 covering blanket over six storage stores, decline to write this as it really ties the company up to the extent of $100,000 on each risk, because at time of the fire it would be possible to have the entire amount in one of the stores.

LIABILITY OF A COMPANY is primarily divided into two classes, contingent and actual or accrued. Contingent liabilities are based on the possibility or likelihood of being called upon to meet claims such as losses. When these losses occur, the liability is then actual or accrued. Policies in force are the principal liability. See Assets.

LIBRARIES—Can properly be classed with schools. The size, construction, arrangement and usage varies according to the community. Some are very large, ornately finished, ashlar fronts, high one-story buildings and with considerable interior decorations and roofed over with a large glass dome. There may be a lecture room with stage and occasional stereopticon or moving pictures. The reading room is usually very clean, but in the basement rubbish is apt to accumulate. Boiler hazard and lighting are important. Good insurance risks if hazards are safeguarded.

LICORICE (stick manufacturing)—Process is crushing, grinding and pulverizing of licorice root in chasers. It is mixed with sugars in paste form, boiled in tanks, where other ingredients are added, made into various shapes by machinery and dried on trays in dry rooms. Fair insurance risks.

LIFE RAFTS, Manufacturing—The wood used is very light in weight, balsam, of a loose fibrous nature. The logs are sawed, dried in steam-heated kiln at about 175 deg. F., then placed in an asbestos-clad, steam-heated cylinder and impregnated with paraffine at about 240 deg. F. It is then worked, i. e., made into lengths for the rafts. The rafts are oval in shape and are roughly put together, and then the edges planed smooth. No nails are used, only wood dowels. When the raft is completed it is placed in an open top steam-heated iron tank and boiled in paraffine at 240 deg. F., then dried, shellacked by brush and a canvas cover sewed on. In the centre of the raft is a platform of wood with woven rope for flooring.

As the wood is very light, considerable fine sawdust and shavings are made and the air will be full of dust unless blowers are attached to all woodworking machines, including band saws, rip saws, swing saws and planers. Each department, i. e., sawmill, assembling, dipping in tanks, impregnating cylinders, shellacking and boiler should be in separate fireproof rooms. Paraffine should be stored away from main buildings, alcohol and shellac in a separate building.

LIGHT METALS—Are such as potassium, sodium, calcium, barium and rubidium, which in contact with water liberates oxyhydrogen gas. See Water.

LIGHT SHAFT—A shaft in the interior of a building for the admission of light; usually has thin glass windows. A light well is a large open or enclosed light shaft. A poor construction feature. See Shafts.

LIGHTNING—The New York Standard policy states that "this Company shall not be liable for loss or damage by lightning unless fire ensues, and in that event for loss or damage by fire only." Fire insurance companies, however, are usually willing to insure against damage to property caused by lightning directly, even if no fire ensues, and the following clause may be included in the form without additional charges.

"New York Standard Lightning Clause"

"This policy shall cover any direct loss or damage caused by *Lightning* (meaning thereby the commonly accepted use

:he term Lightning, and in no case to include loss or ıage by cyclone, tornado or windstorm), not exceeding sum insured, nor the interest of the insured in the prop- r, and subject in all other respects to the terms and con- .ons of this policy. Provided, however, if there shall be r other insurance on said property this Company shall be ɔle only pro rata with such other insurance for any direct s by Lightning, whether such other insurance be against ect loss by Lightning or not."

Lightning is caused by the disruption discharge of the sitive electricity in the clouds rushing to equalize the gative electricity in the earth, or vice versa. Discharges ward are by no means uncommon, although not often ob- ·ved. Lightning is scientifically known as static electricity.

LIGHTNING RODS, if properly installed, effectually pro- :t buildings. Prof. Dodd says: "Let us see how a flash of htning is made, for there is always something at work ead of the lightning flash, getting things ready.

'Before a house is struck with lightning, the house is st charged by induction.

''Induction' is taken from the word 'induce' and induce :ans to 'coax or pull your way.'

'Before a house is struck by lightning an electric strain is ıced upon it. That is, a condition has been coaxed into and it is this condition we have to deal with if we would :vent it from bursting into a lightning explosion.

'Now the air is a poor conductor of electricity, and things ıt stick up from the earth into the air, like houses and rns, become discharging points for the earth's electricity, d in this way the house gets ready to be struck.

'So the lesson we wish to impress here is this: 'Lightning due to causes.' Electricity first gets in its work and loads a cloud. Then this cloud fixes up things on the earth and luces an opposite electric condition, and the two electrified rfaces strain and pull on each other, and when the strain ts great enough so that the air cannot resist any longer, she goes with an explosion through the house, and the dertaker has a job on his hands."

Cattle or other livestock herded in wire-fence enclosures

are apt to be electrocuted if in contact with the charged wire.

LIGNITE—Carbonized fossil wood. The natural lignite is of brown color and has a distinct woody structure. When exposed to the weather the lignite dries and crumbles into small flat pieces or flakes. Subject to spontaneous combustion.

LIGROIN—A volatile distillate from crude petroleum. Inflammable. Flash zero F. See Petroleum.

LIME—Obtained by calcining marble. See Calcium Oxide.

Lime (unslaked) is the same as quicklime, caustic lime or calcium oxide. When in contact with water, a temperature up to 800 deg. F. is reached. It should be kept under a water-tight shed or building on proper skids. Many fires have been caused, especially along the water front, when the rising tide causes the lime to slake, creating enough heat to set fire to the structure. Firemen playing hose on lime will slake it with the same result. This stock is usually found in builders' material yards.

LIMESTONE FRONTS of buildings are damaged by heat more than any other granular building stones. They become calcined under intense heat, or are decomposed into lime.

LINE—The amount of liability which a company carries on a risk. The amount is determined by the loss ratio according to the company's underwriting experience or judgment. It is difficult to determine how many times the unsprinklered risk line, a good sprinklered risk should take, as experts consulted claim anywhere from 3 to 15 times. See Average Risk, also Block Lines.

LINCRUSTA—A wall covering. See Wall Coverings.

LINEN—The very highest grade of Irish linen is used for covering aeroplane wings.

LINENS offer very good salvage if only damaged by clean water and are dried immediately.

LINIMENTS usually contain crude petroleum, ether, alcohol, chloroform, turpentine.

LINOLEUM—The foundation of linoleum is burlap. This

mpregnated with ground cork, linseed oil and oxide of l in a calender roll. A heavy coating is then applied and ıted in various designs. The coating mixture is made of m (light cotton fabric) which is hung on racks and satted with linseed oil. The oil which adheres at about 100 . F. rapidly hardens. This process is repeated until there . thick coating (called skin). The roll is then cut down ground between rollers. A cement is made of oil, resin, ri gums and ground cork and colored if desired. The :ture is cemented on the burlap foundation. The printof designs is a continuous process, the sheets passing ɔugh a machine under blocks of different colors which, ng and falling, do the printing. Hazards of cork grind. dry rooms, oil soaked premises and spontaneous comtion in oily materials. Hard burning risks. Class genlly avoided unless hazards are well safeguarded and ldings sprinklered.

.ineoleum (ground) is subject to spontaneous combustion en moist.

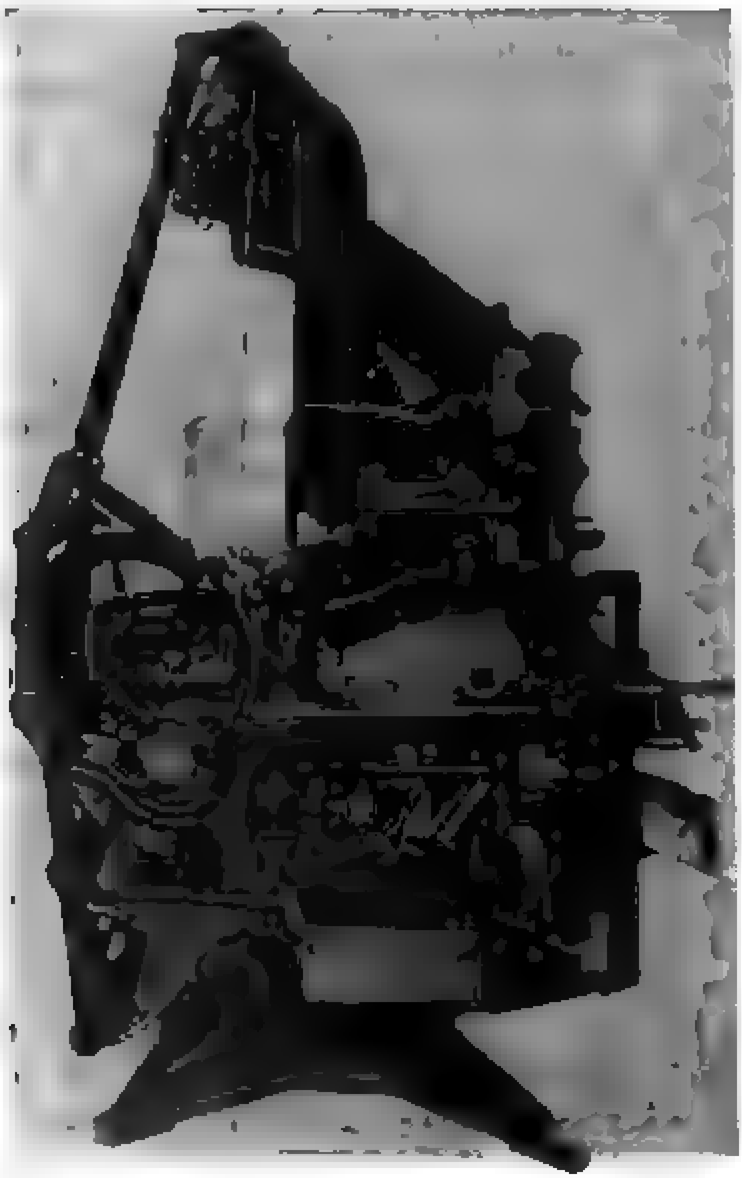
.INOTYPE MACHINES resemble huge typewriters and up one complete line of type at a time. The operator ; at a keyboard, strikes a letter and the matrices (brass gs on which is an impression of the desired character) fall vn through a channel until a line of type is made up. tal followers push the line across until it is dropped in nt of a pot of hot type metal. The lead is forced by air ssure against the matrix. The only hazard is the lead , which is usually gas heated. The gas connection should rigid iron piping. Metal should be placed on the floor ler the machine. These machines are usually purchased installments from the manufacturers who retain a pur.se money mortgage. See Printing Hazards.

.INSEED OIL—Is pressed from flaxseed by either cold hot process. Moderate steam heat is required for kettles l presses where the seeds are cooked and pressed. Floors ıally very oily. A poor class to insure.

.INTEL—A horizontal beam across the opening in a wall :r windows, doors, etc. When of wide span and support-

ing heavy brickwork or masonry it is called a "breast-summer."

LINTERS (unbleached)—The cotton scraped from the



Courtesy Mergenthaler Linotype Co.

Linotype machine electrically heated.

cotton seeds after the best or loose cotton has been removed.

LINTUS—See Indian Cotton.

LIONITE (Used for Backs of Brushes)—Made from powdered asbestos with resin, shellac and lampblack in small *proportions* (not hazardous).

IEFIED PETROLEUM GAS is liquid condensed by ssing the gas from petrol oil wells. Classed as in- ble.

JID AIR is air condensed into a liquid at high pres- d low temperature. A powerful explosive.

JID BRONZE—See Bronzing Liquid.

JID CEMENT—A rubber cement used for roofing.

UID GAS—Obtained by the dry distillation of raw um and by-products of the lignite and oil industries. pors and gases are obtained by the decomposition of terial in retorts, passed through tar separators and l. The gases are liquefied by cold and pressure, car- l and put in cylinders for shipment.

JID TANKS (for Gasoline or Other Inflammables) **ing liquids** can best be extinguished by forming a of **gas** such as generated when carbon tetra-chloride arbonate of soda, or a solid is formed on the surface. its off the supply of air and dilutes or breaks up the of natural air by introducing a non-inflammable with it.

id Storage Tanks—The size of tanks, distance from gs and location are determined by local underwriters overned by National Board rules. Small sized tanks ually buried three feet under ground, and below all connected thereto, set on a solid foundation and have and vent pipes. Tanks should be of all steel or it iron, all joints riveted, soldered or caulked, brazed led (**soldering alone is insufficient**), and coated on the with rust-resisting material such as tar or asphaltum. l pipe should be screened with fine wire mesh and the ipe not less than three feet from a window or other g. Only an approved pump or device should be used r liquid direct to receptacle, and such liquids not to be n containers. See Gasoline.

able tanks of 40 to 60 gallons capacity are built of teel 3/16 inch thick, set on rubber-tired wheels with ap- pump and vent pipe. These latter are used mainly in s.

UOR *in barrels will yield a greater salvage if the bar-*

rels are laid on their sides instead of ends, as this method will prevent water from seeping through and spoiling the contents.

Liquors—There are two kinds, **fermented** and **distilled**. All spiritous liquors are fermented. **Distilling,** a hot process, embraces the whole process of making of potable spirit from cereals and grains. This process includes the grinding of the grain, mashing and fermentation, and thereafter the separation of the alcohol from the other constituents.

Refining—The purification by redistillation for the purpose of eliminating impurities.

Blending—Mixing together, by a cold process, whiskeys, spirits, gins and other such articles.

Clarifying—For the purpose of clearing the color of wines either by allowing sufficient time for the liquor to settle or by hastening the process by adding such substances as whites of eggs, Spanish clay, gelatine or other ingredients.

Filtering—The straining of liquors.

Compounding or Rectifying—A cold mixing process.

Additional hazards in distilleries are extract-making, coopering, barrel painting, bottle washing, storage and handling of alcohol in large quantities. A quick burner. Poor fire record. See Distilleries; see Rectifying.

LIQUORINE—An approved benzine substitute used for cleaning printing presses.

LISTED NON-FIBRE STORAGE—Stores used for the storage of general merchandise. In New York City the rates are figured on the Exchange Mercantile Schedule with an allowance of 35 per cent for base rate and 17½ for the building. This final rate, called base rate, to be added to the rate for the commodity desired to be stored. For example: Baking powder is 17c + 10c base, makes 27c proper rate to be charged. Classed as good insurance risks. See Warehouses; see Storage.

LISTED STORAGE STORE—See Warehouses.

LITHARGE—Is yellow oxide of lead. Made by heating lead in an open vessel. Not hazardous.

Sodium Nitrate Crystals (in litharge manufacturing) are *dried in a wooden*, rotary, cylindrical dryer, having open

ls, driven by gearing and cogwheels, and heated by hot Fires have started at the greasy driving-gears due to tion.

ITHOFRACTEUR is a foreign make of nitro-glycerine. nposed of nitro-glycerine, silica, carbon-sulphur, nitrate soda and clay. More powerful than dynamite.

ITHOPONE—A dry powder used in paint.

ITMUS—By boiling blue cabbage or certain lichens in er, a blue solution is obtained. A drop of acid added to liquid turns it a bright red. Gives a blue color with al- s. Used as an indicator of the presence of alkalis or ls in laboratories. Used in experimental laboratories.

ITHOGRAPH CRAYON DRAWINGS—Artists draw stones with ordinary crayon, after which the stone is ted with a solution of sour gum (gum arabic with a few ps of nitric acid). A separate stone is used for each or. When a blue color is desired, instead of drawing with von they first sensitize the stone with a solution of bi- omate of ammonia and white of egg, then photograph on The stones are usually cleaned with turpentine. Highly eptible to smoke and water.

ITHOGRAPH INKS are similar to printers' inks except they contain grease, such as tallow and soap, also shel- the latter in small quantity.

ITHOGRAPH SHEETS may be subject to spontaneous ıbustion if placed in large piles before being thoroughly d. This heating is caused by the linseed or other dry- oils in the ink.

ITHOGRAPH STONES AND PLATES—Very suscep- e to fire and water damage, and may crumble almost to t when so damaged. The stones are imported. The heim stones are secured from Bavaria. Inferior stones ı similar nature are found in France.

ITHOGRAPHING—Most stones used in lithographing imported from Bavaria and come in sizes from those ing an area of about one square foot to those which e an area of about twenty square feet. They are usually inches in thickness, but can be used until they are not than one inch thick. This is made possible by back-

ing them with slate which not only provides the required thickness but also strengthens them as well. The principle of lithographing is the printing from a flat stone surface so treated that ink will adhere to the design only. To get this result it is necessary to have two stones called the engraved stone and transfer stone. The process is as follows: the stone is polished by hand with pumice and water until its surface is perfectly smooth. It is then given a coating with a gum arabic solution which is left on the stone to protect it. The stone is then engraved by hand, and in doing this the engraver cuts through the hardened gum solution and removes it while the rest of the surface remains protected as before. When the gum solution on the stone is kept wet, no ink will adhere to it, and when the engraved part is inked, no water will mix with the ink. The stone is therefore moistened with a sponge and "rolled up" or inked with a leather ink roller. The stone is now complete and is called the engraved stone, but as mentioned before, the printing is done from a stone having a flat surface called a transfer stone. The next step is to transfer the engraving to the flat surface of this stone. After the engraved stone has been inked a piece of specially prepared paper is laid on the engraving and it is subjected to pressure in a hand press. The engraving is now transferred to the paper which is then laid on the second stone with the ink-side down. The ink under pressure eats into the stone which previously has been polished with pumice stone and water, but has not been protected with the gum solution. The transfer paper is now removed and the stone is covered with the gum solution which adheres to those parts only which have not received the ink from the transfer paper. The stone is now moistened with water and again inked. After being proof read it is placed in the cylinder press similar to those described above and is ready for printing. These presses have both ink and water rollers, under which the stone passes back and forth at each revolution. Good insurance risks.

LIVE LOAD—A load on a structure which varies in weight, as the movable contents of a floor.

LIVE RISER—The pipe leading from the supply tank

:h mains and laterals to feed the sprinklers. See Sprink-s. See illustration, page 636.

.IVESTOCK—See Stables; see Lightning Rods; also ›oded Livestock.

.OCAL ALARM—An interior alarm system required by .ny Fire Prevention Bureaus to be installed throughout ›uilding with one or more boxes on each floor. In case fire the glass in box is broken by a hammer attached it by a chain; the breaking of the glass allows a lever complete or break a circuit (depending upon the type of stem) and cause an alarm gong to ring on each floor. The stem is designed mainly for the conservation of life.

Local Alarm for Sprinkler System is an electrical connec-n to the water flow valve just below tanks. When a :inkler head opens, water flows through the pipe causing : valve to move and make an electrical connection and ise a large gong to ring at engineers' headquarters in base-nt. This type of alarm is a poor one for a sprinkler iipment, as a fire may occur and engineer may not be iilable. A better system is to have connection made to a itral station office established just for the purpose of re-ving such alarms and where they are relayed to fire de-tment headquarters. See Alarms.

.OCK CORNER MACHINES—For cutting tooth-like ›jections on the end of pieces which are to form the con-'rent sides of a box or drawer; vertical or horizontal man-:ls carry gauges of saw-like cutters which rotate rapidly. nsiderable fine refuse is made.

.OCKERS—In the Metropolitan Museum of Art, New rk City a fire started, evidently, by spontaneous combus-n in the locker room where the artists store their can-ses, paints, oils, brushes, etc. All lockers should be of tal on raised legs with open screen front to allow ven-ition. In this manner, refuse under the lockers can be .dily seen, and a fire can be seen through open front. !y waste in pockets of workmen's overalls is apt to cause :.

.OCK-JOINTED—See Fire Doors. See illustration of *nmunications, page 143.*

LOCOMOTIVES for Mill Yard Use—Steam locomotives without fires are now being used. The steam is pumped into a reservoir under high pressure. The tank is sufficiently large to run the engine for several hours. This eliminates the danger of spark fires from the ordinary locomotives.

LOCOMOTIVE SPARK HAZARD—This hazard is an ever-present one along railroads, especially where bituminous coal is used for fuel. Buildings, especially with shingle roofs, within a radius of one-half mile, should be written with this hazard in mind.

LODGE ROOMS—See Halls.

LODGING HOUSES—Usually of ordinary construction with joist floors, open or poorly enclosed floor openings. Individual rooms are usually enclosed in frame partitions extending part way to ceiling, thereby adding considerable combustible material to the interior. Hazards are pot stoves for heat, furnaces, use of benzine for exterminating insects, swinging gas jets, and smoking. Usually located in the poorer sections. The fire record is poor. See Boarding Houses; also Furnished Rooms.

LOFT—The first loft of a building is the first floor above the grade.

LOFT BUILDING—Usually interpreted to mean one occupied by omnibus manufacturing tenants.

LOGWOOD is wood from which logwood dyes and extracts are made. It is received in this country in varying lengths up to 6 feet and small in diameters. The surface under the bark is very splintery. When on fire in dry state burns very rapidly due to the rough surface, smolders a long time and sparks and embers fly a considerable distance in wind. When on fire, the smoke is thick, pungent, opaque (making nearby objects invisible) and hard to fight. In small piles it is readily extinguished, but in large piles up to 40 feet, the fire will smolder for days.

LOGWOOD DYE—The dye is extracted from logwood as follows: The logs are chopped into chunks, sawed by power saws, broken into smaller pieces and ground in machines. It is cooked in steam-heated vats where it remains until the dye is cooked out of the wood. The liquor is sep-

arated from the mass by centrifugal extractors and barrelled. Lines should be written cautiously. See Dye Woods.

LONGITUDINAL SECTION in a drawing shows the object lengthwise as distinguished from transverse or cross.

LOSS (Requirements in Case of Loss)—The N. Y. Standard form of policy reads: The insured shall give immediate notice, in writing, to this Company, of any loss or damage, protect the property from further damage, forthwith separate the damaged and undamaged personal property, put it in the best possible order, furnish a complete inventory of the destroyed, damaged and undamaged property, stating the quantity and cost of each article and the amount claimed thereon; and, **the insured shall, within sixty days after the fire, unless such time is extended in writing by this Company, render to this Company a proof of loss,** signed and sworn to by the insured, stating the knowledge and belief of the insured as to the following: the time and origin of the fire, the interest of the insured and of all others in the property, the cash value of each item thereof and the amount of loss or damage thereto, all incumbrances thereon, all other contracts of insurance, whether valid or not, covering any of said property, any changes in the title, use, occupation, location, possession, or exposures of said property since the issuing of this policy, by whom and for what purpose any building herein described and the several parts thereof were occupied at the time of fire; and shall furnish a copy of all the descriptions and schedules in all policies and if required, verified plans and specifications of any building, fixtures or machinery destroyed or damaged. The insured, as often as may be reasonably required, shall exhibit to any person designated by this Company all that remains of any property herein described, and submit to examinations under oath by any person named by this Company, and subscribe the same; and, as often as may be reasonably required, shall produce for examination all books of account, bills, invoices, and other vouchers, or certified copies thereof, if originals be lost, at such reasonable time and place as may be designated by this Company or its representative, and *shall permit extracts* and copies thereof to be made.

Loss (When Payable)—The N. Y. Standard form of policy reads: The amount of loss or damage for which this Company may be liable shall be payable sixty days after proof of loss, as herein provided, is received by this Company and ascertainment of the loss or damage is made either by agreement between the insured and this Company expressed in writing or by the filing with this Company of an award as herein provided.

LOSS ADJUSTMENTS—Many of the unsatisfactory loss adjustments are caused by the failure of the assured to make satisfactory proof of the value of the stock at the time of the fire. Misguided people do not try to salvage any goods after a fire by separating the damaged from the undamaged goods for fear of experiencing trouble with the insuring company. Non-current forms are an ever-present source of trouble to an adjuster. See Proof of Loss; see Fire Losses.

LOSS COST—The relation between the amount of property insured in a certain class and the amount paid in losses. Loss cost is the cost of carrying a certain class of risk.

LOSS RATIO—The percentage that the amount paid in losses bears to the premiums received in any class of risk.

LOST POLICY RECEIPT (or voucher) is a release given by the assured to a company when the original policy has been lost, thereby releasing the company from obligation under the contract.

LOUVRE—A slatted ventilator. Used in place of a window. Built of metal or wood slats, slanting to permit foul air to escape from a room but preventing fire from entering from the shaft, because the openings between slats slant inwardly. When used in shafts should be of metal with riveted rather than soldered joints. See Diagram on Ventilating Shafts, page 726.

LOWERATOR—A hoist, constructed of lugs or arms on a moving frame by which barrels or cases are conveyed from floor to floor. As they usually form an open shaft underwriters do not look upon them with favor. O. K. if properly protected.

LOWER FLANGE—The under part of "I" beams. These

uld be protected with at least two inches of approved ılation, although if unprotected, this should not be conːred a serious defect in construction if the arch springs n the lower flange and protects the webs.

ˌOW TENSION CURRENT—An electric current of low ːnsity or voltage.

ˌOW WINES are classed as alcohol, cologne spirits, ːl oil and other alcohol by-products. See Distilleries.

ˌUBRICATING OIL—Manufacturing consist of mixing erent grades of heavy mineral oil with some animal or etable oil. The lower the flash point, the more likely is atmosphere surrounding the machinery to be impregːd with inflammable vapors. When burning, its heavy ›ke is likely to cause damage to susceptible stocks in imliate neighborhood.

UDLOW TYPOGRAPH MACHINE—A newly-inventmachine for setting lengths of lead type in line lengths ilar to monotype work, except that this machine is smaller the type is cast against a brass matrix.

UMBER—Hard woods are generally classed as those cut n broad-leaved trees. Underwriters prefer hardwood and ːe larger lines on them than on soft woods. Soft woods are ıe from coniferous or needle-leaved trees, such as pine, ıce, cedar, etc. The following woods are considered **1 woods:** Ash, Beech, Birch, Box Wood, Buckeye, Catalpa, ːrry, Chestnut, Cucumber Tree Wood, Elm, Eucalyptus, n, Hickory, Holly, Laurel, Lignumvitæ, Locust, Mahoga- Maple, Oak, Osage Orange, Persimmon, Sassafras, Sycare, Teak, Tulip, Tree Wood, Walnut, Willow. **Soft woods** : California Red Wood, Bass, Cedar, Cotton Wood, ›ress, Fir, Hemlock, Larch-tamarack, Soft or Hard Pine, ›lar, Red Wood, Spruce, Whitewood. (S. T. Coale.)

ˌumber—Second-hand lumber is somewhat better than er second-hand stocks, as there is always a market for it. a class, second-hand lumber yards are not attractive risks. ːy usually occupy leased ground.

ˌUMBER YARDS—Inspectors should state whether it is d or soft wood; note the height of piles, and whether ːd solid or with open spaces between, and whether piles

rest on earth, shavings, sawdust or skids. He should note the aisle space, whether lumber exposes windows of mill or other buildings, prevailing winds, whether yard is fenced in. If near a steam railroad there is danger from sparks of locomotives. Lumber yard fires are hard to fight. Serious exposure to surrounding properties. Rating bureaus add a charge for exposure to lumber if the mill exposes the lumber yard, unless 100 feet distant. Fair insurance risks if soft wood. Good insurance if **hard** wood.

LUNCH WAGONS—Restaurant hazard with greasy premises. Stove for cooking is usually in a confined space, the smoke pipe passing through a poorly collared roof or wall.

LYCOPODIUM—Obtained from certain plants. In powdered form it is inflammable.

LYDDITE is a form of gun-cotton; an English trinitrophenol.

LYE—Common name for Hydrate of Potash or Soda.

M

MACARONI MFG.—The farina and flour are received in bags, then dumped in hopper and conveyed to storage bins according to the grade. From the storage bins, it is brought by worm conveyor to the scales to be weighed according to the batch desired. It is then dumped in the mixing machines which are directly under the scale, hoppered to the kneaders, then passed to the rolling machines where the mass is rolled up into ¼-inch-thick cartridge forms and dropped into macaroni cylinder presses. The plungers of the press are forced down by hydraulic pressure, squeezing the paste through a compartment die which is perforated with a number of circular holes with a core held in the centre. It is dried atmospherically or in heated rooms. Dry Room, principal hazard. "Up to date" plants have good fire record.

Macaroni Shops in basements are usually crowded, and have unsafe dry rooms or heating apparatus. Many of these shops employ direct coal heat for drying purposes.

MACHINERY—Heavy machinery on upper floors, even though normally substantially supported, has wrecked many buildings in case of fire because the supports weaken or burn away. Drip-pans should be placed under all oily machinery to catch oil drips and so prevent oily floors.

Machinery in Rapid Motion—See Shaftings.

Machinery (Second-hand)—Even old or unused, usually has a market value unless obsolete, badly damaged, or worn out, in which case it has only the value of old iron.

MACHINES of a revolving type, gas-heated, are permitted by some rating bureaus to have flexible rubber connections instead of rigid iron piping.

MACHINE SHOPS—See Metals Workers.

MADDER—The root of a plant from which a variety of

colors are produced, such as red, pink, purple, black and chocolate. Should be kept as dry as possible, as it has a great affinity for oxygen and is liable to heat.

MADE GROUND—See Ground.

MAFURRA OIL—A grease or fat very much like palm oil.

MAGENTA—A rose dye obtained from coal tar.

MAGIC METAL POLISH—An approved benzine substitute.

MAGNESIUM POWDER—Will burn readily and is somewhat hazardous in the presence of water. A stream of water will scatter the burning particles. Should be stored in a dry place.

MAGNET—A magnetic device placed in grinding mills, hoppers, chutes, feed spouts, etc., to arrest any metal particles and prevent them from entering the machine where, in grinding or milling, they may create a spark and explode the dust in the mill.

MAGNETO MAKING—Machine shop hazard, annealing, nickel-plating, buffing, testing, sealing with wax, benzine for cleaning parts, lacquering. Fair insurance risks if lacquering feature is properly safeguarded.

MAGNOLIUM—An alloy of aluminum and magnesium (90-98 per cent aluminum). It is imported in pigs or ingots for casting.

MAGUEY—A fibre classed as hard. See Fibres.

MAIL ORDER CONCERNS—They carry nearly every variety of goods. Where no manufacturing is done, the premises resemble warehouses with open stocks on shelves or in tills. Included in the general merchandise there may be calcium carbide, automobile tires, rubber cement, small arm ammunition, lubricating and other oils, furniture and celluloid articles. Large concerns usually have repair departments for damaged merchandise. If well established in good constructed buildings class is a profitable one.

MALEFERN—A root used in manufacturing oil, food extracts and tinctures.

MALOCHITE GREEN CRYSTALS—An aniline dyestuff produced from aniline oil.

MALT EXTRACTING—(A process which follows malt

asting.) The grain is soaked in tanks of cold water, then eam is turned into the tanks to cook it, then it is evapoted and packed in kegs.

MALT ROASTING (for Breweries)—Malt received from eweries, roasted usually in an ordinary coffee roaster which onsists of a cylindrical revolving drum equipped with agitor and heated by direct coal heat. It is drawn off in etal-cooling pans, where the heat is drawn out by suction, ien "lofted" by cup-conveyor to a hopper which feeds a rinding mill. A magnet should be at the hopper or at the ollers of the mill to catch metallic pieces such as nails. See rewery Malt Mills.

MALTHA—Partly solidified petroleum. It requires naphia to render it soluble.

MANGANESE—An ore, mined in the State of Georgia but iainly imported from Russia, India and Brazil. As an alloy is used extensively in making steel. Not hazardous.

MANGANIC ACID—Is a powerful oxidizing agent.

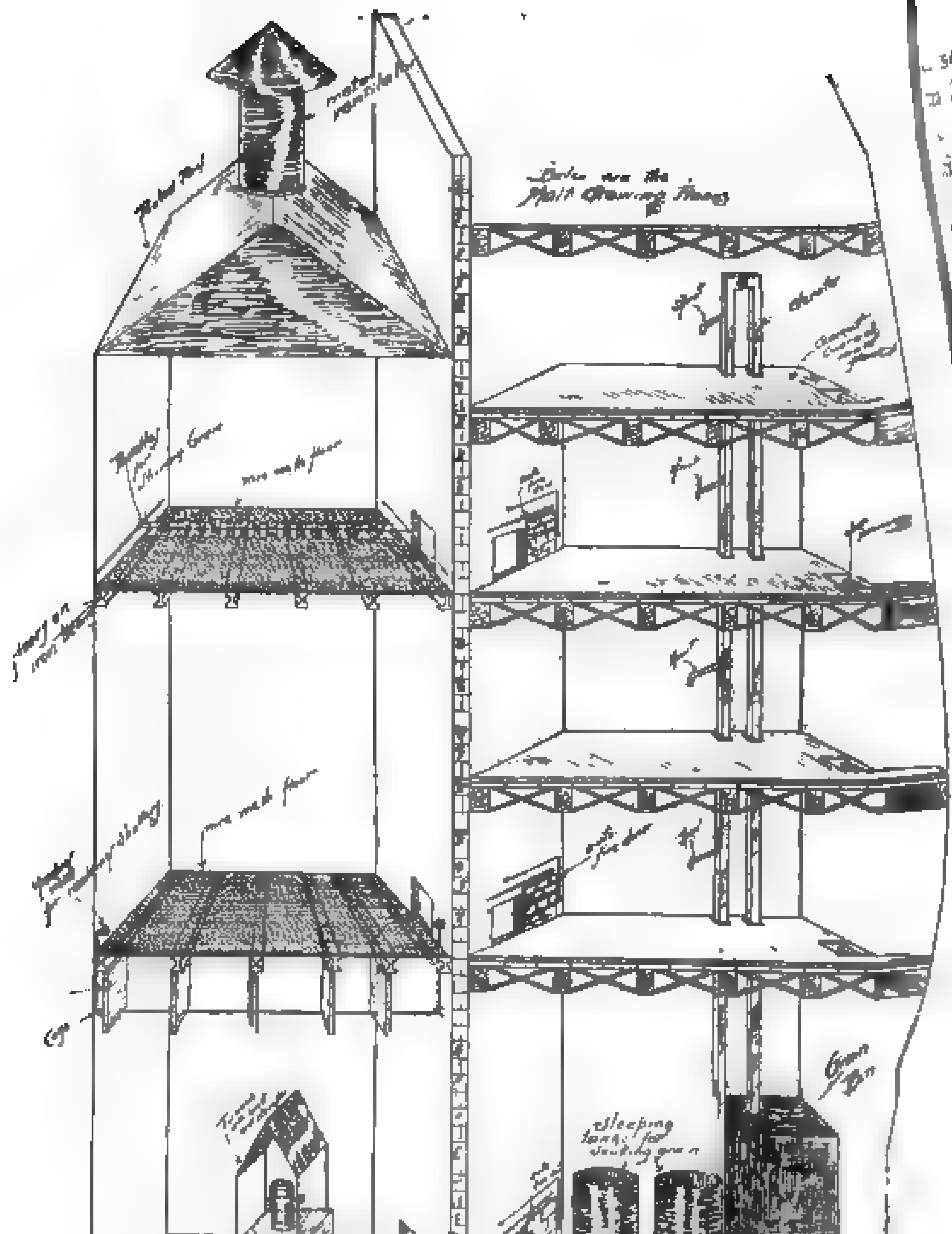
MANGLE—An ironing machine used in laundries for flat ork. They are large steel rollers, cloth-covered and either team or gas-heated.

MANICURISTS—Usually locate in private dwellings, partments or barber shops. They may have or make small uantities of cosmetics and pomades. At times use alcohol oves or gas stoves. If in a dwelling, and not over three ands employed, with the owner living on the premises, there no extra rate charged for this occupancy in New York ity. Fair insurance risks. See Massage Parlors.

MANSARD—The top portion of the outer walls which ope to the roof. The backing is usually of wood or lath id plaster on studding. Termed by fire fighters as "a lumer yard up in the air" because of their inability to locate ie seat of the fire once it gains access to the concealed pace. Many fires commence in these roofs.

MANTLES—See Gas Mantles.

MANUAL ALARM—Usually a small red box with a ring ttachment at the bottom, which if pulled down sends in a re alarm. Only systems operating through a central staion are approved. Boxes should be located near main exits



Courtesy of the "Weekly Underwriter." Drawn by W. O. Lincoln.

A typical malt house showing malt growing floors, steeping tanks, drying floors and heating device.

ɔ that from any part of the plant equipped, not more
00 feet will have to be traversed in order to reach the
Boxes should be located on first floor and alternate
s above, and in each section of risk. All boxes should
ted monthly and a record of these tests made.

NURE IGNITION—"Stall manure should be kept
on top when piled in quantities and away from all
enerating substances, such as ashes and sawdust, and
the rays of the sun. Don't make the heap any larger
ou can control in case of fire. The best plan is to put
he land as soon as possible.

tificial manures, containing potash salts, chloride of
, magnesia salts and the like are safe and incombus-

osphate of lime manures are not dangerous except
bagged damp and packed in large heaps. Here the
laking hazard enters, and one must be careful not to
damp.

e nitrates absorb a great deal of moisture and loosen
re of the bags so that it is possible for the smallest
to enter; it might smoulder for a long time, and then
ly burst into flame. When the bags become satu-
with the nitrate they are highly inflammable." (On-
Fire Marshal Department.)

NUSCRIPTS—See Uninsurable Property.

P CLERK—A junior underwriter whose main duty is
s daily reports and to write the "lines" on the map
t the company's liability can be seen at a glance. He
also understand forms and rates and adjust reinsur-
See Underwriter; see Examiner.

RBLE is easily damaged by fire, as it calcines and dis-
ates. Where it forms any considerable part of the
g structure such as marble fronts or facings, under-
s usually cut down their "line."

RBLE WORKERS—Stone and granite such as used
dings are included. Work is sawing, planing, cutting,
g, polishing, rubbing. Polishing is done by machinery
, soft stones, using a mixture of dry putty and oxalic
s an abrasive. Glycerine is used for highly polished

stones. Broken pieces are cemented with plaster of Paris, beeswax or stick shellac. The latter two are usually heated by gas blow pipes while the marble is being cemented. Gas or gasoline torches are used for heating lead for dowels. Usually occupy large area frame buildings heated by "salamanders." See Imitation Marble.

MARGARIC ACID is obtained from hog fat and potash. Not inflammable.

MARGARINE—See Cocoanut oil.

MARINE GLUE—One part India rubber, 20 parts gum lac and 12 parts benzine.

MARINE INSURANCE—Is a contract whereby one party for a specific sum agrees to indemnify another who has an interest in property of a marine risk against loss incidental thereto. The policy covers goods from port to port but by endorsement they may be covered from some place in the interior until delivered to the assured's store or warehouse at port of destination. Almost all marine policies are valued contracts.

MARINE-LEG—Used in connection with grain elevators located on water fronts. A movable elevator leg, so arranged that grain can be conveyed from the hold of a boat by dipping the elevator boot into the hold.

MARKED OFF—Insurance is marked off if an application or policy is returned to the company as not wanted before it has taken effect.

MARKETS (either private or public), where fish, meats, vegetables, etc., are sold, are usually large area buildings, with high ceilings. In public markets many tenants are found, each having a stall. There may be portable gas or coal heated baking ovens, restaurants, refrigerating machinery, coffee roasters and peanut roasters. Inspect for swinging gas brackets, unsafe electric wiring, unsafe stoves and carelessness in handling packing material. Once on fire, they usually result in a total loss. (Poor fire record.)

MARKETS (Chicken)—Especially where killing is done are usually untidy with feathers, guano and wooden crates. Stoves are used for heat and for heating water. Not an at*tractive* class.

IARKET VALUE—See Sound Value and Actual Cash ue.

IARSH GAS—See Fire Damp.

IASSAGE PARLORS—Usually in connection with hair ssers and manicurists. Use electric vibrators for massag- , electric baths and various other electric appliances. ne are connected with the lighting system by ordinary kets. Others are on separate circuits or run by storage teries. Alcohol and face creams are used extensively. ves are often heated on alcohol stoves. Fair insurance :s if well established. See Manicurist.

IASSICOT—Oxide of lead.

IASTER FILM—See Motion Picture Films.

IASTIC—A resinous substance from a shrub. Used in nish-making.

IATAZIETTE—A powerful explosive composed largely nitro-glycerine.

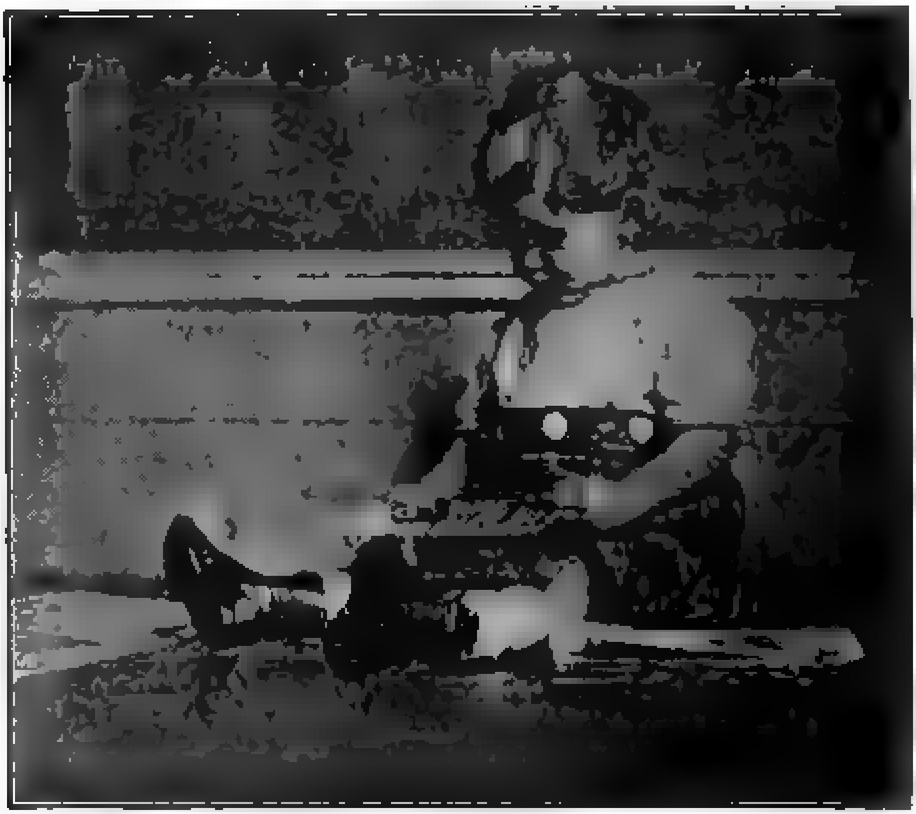
IATCHES (Manufacturing)—Many different processes employed. One of the common being: a cylinder of pine poplar wood, the length of seven matches, which has been ked in water to make it tough, is placed in a lathe which s off a continuous shaving, the thickness of a match. As shaving comes away from the log, it is cut into seven ps, each as wide as a match is long. As soon as the nts are separated from the block, they are seized in iron np-plates which form an endless chain. The endless in carries the splints across a steam-heated drum which ·ms them nearly to the temperature of paraffine into ich they are automatically dipped. From the paraffine h the splints move on continuously to the rollers that ry the "heading" mixture, phosphorus, chlorate of potash, , and as the matches are carried past the rollers each receives a red or blue head as the case may be. From rollers they continue on through a room swept by a blast cold, dry air. The matches move on until just before they ch the starting point, air again automatically thrusts them and places them side by side in a box.

The composition of match heads varies a great deal in dif- ent factories and consists of various combinations of glue,

rosin, phosphorus, sulphur, chlorate of potash, saltpetre, red lead, bichromate of potash, nitrate of lead, antimony sulphide and fine sand. (Poor fire record.)

The **sulphur match tip** is made of a paste consisting of chlorate of potash, sulphur, colophony, vermilion and gum.

The **"strike anywhere"** match tip usually contains phosphorus and potassium chlorate.



Courtesy of the N. Y. Fire Department.

The cause of many tenement fires.

The **"strike-on-box"** match head is partly composed of potassium chlorate while the box contains red phosphorus.

Paper match heads are dipped in chlorate of potash, amorphous phosphorus, sulphur and iron oxide.

Incomplete reports of the National Board of Fire Underwriters for the year 1915 show a loss over the country totaling $4,324,596 due to matches.

In New York City alone, the fire department's report of

1915 shows that there were 1,346 fires attributed to matches, causing a loss of $227,886.

The Underwriters' Laboratories of Chicago have made a careful study and test of matches and now issue the label service covering this line of goods. The testing covers the subject of flying heads, ignition temperatures, stability of head and composition, afterglow, strength of splint and method of packing.

The label service is divided into two classes. Class "A" is the "strike on the box" type, where the match is struck on a prepared surface and the ignition point is above 340 deg. F. Class "B" is the so-called "strike anywhere" match, and the ignition point is above 300 deg. F. This type of match is double-dipped, the outside bulb being inert and of larger diameter than the tip. It is constructed so that it will not ignite from friction or when it is trod upon. The splints of both types of matches are treated to prevent afterglow, and they are required to be of a reasonable strength.

The hazard from the careless handling of matches cannot be too greatly emphasized and it would be well to advocate stringent laws for those who continue to use them with utter disregard for the loss of life and property that they may cause.—(S. T. Skirrow in The Weekly Underwriter.)

MATRIX—See Stereotyping.

MATTRESSES—Materials used are tow, shoddy, sea grass, cotton, hair, moss, excelsior and fibres. Work consists of picking and rolling cotton or other materials in pads, filling and tufting, sewing slip covers. They may also assemble and paint bed springs. Hazards are cotton and fibre picking and carding, storage of upholstering material, dust in the presence of open lights, and loose materials about the premises. In small shops, coal stoves are used for heat. Unless the various processes are segregated, the entire floor may become covered with dust. Serious exposure to surrounding properties. A very poor fire record class.

MATZOTH BAKERY—Matzoths are made of flour and cracker dust. Bakers use sifters and cleaners, and occasionally mill flour. The baking oven is brick enclosed with fire box underneath. The dough is placed on a revolving metal

drum over the fire and baked in one revolution. When baked, the crackers drop on a woven cloth belt conveyor which takes them to the packing room. Some of the crackers may be burning and if not removed from the conveyor are carried to the packing room where they might set fire to combustible material. Several fires have been attributed to this cause, and also to friction in dust box of flour mill. (Poor fire record.) See Bakeries.

MAURITIUS—A hard fibre.

MEAT PACKERS—See Packing Houses.

MECHANICS' PRIVILEGE AND BUILDERS' RISK—The New York Standard policy reads: "Unless otherwise provided by agreement in writing added hereto, this Company shall not be liable for loss or damage occurring while mechanics are employed in building, altering or repairing the described premises beyond a period of fifteen days."

The rate charged for insurance and the acceptance of a risk is based upon the condition of that particular risk at the time the policy is written. Any extraordinary repairing, altering, reconstruction or rebuilding of the property insured, with the added hazard of mechanics and materials, such as paints, heating devices and other unusual conditions, means a state of affairs not existing when the risk is accepted, and for which the rate charge for a dwelling or store and dwelling, mercantile or even a manufacturing occupancy, does not pay.

If it is desired to make extensive changes which would take a longer time than the fifteen days allowed by the policy, an endorsement known as a "Builders' Risk" must be attached to the policy, for which an additional rate and premium are charged, according to the time required to complete the alterations. (A policy issued to cover a building in course of construction is also known as a "Builders' Risk.")

As there are many small repairs, however, which the Companies feel do not involve any considerable increase of hazard, a general permission to do such, known as the "Mechanics' Privilege," is usually attached to policies, without charge, this clause reading: "Permission for mechanics to

be employed for ordinary alterations and repairs in the within described premises, but this shall not be held to include the construction or reconstruction of the building or buildings, or additions or the enlargement of the premises." Just when and where a builders' risk condition takes place is sometimes rather a difficult question to decide, but most underwriters claim that so long as the building is not weakened or added to but merely altered by means of painting, carpentering and other interior work, the mechanics' privilege is all that is necessary. See Builders' Risk.

MECHANICAL DRAWINGS cannot be insured under the Standard policy form.

MEDICINAL OILS—See Mineral Oil.

MEDICINES—Their manufacture involves the use of any drugs and chemicals in the pharmacopia, including large amounts of alcohol. The ingredients are mixed, cooked, distilled or compounded in various ways, either hot or cold. The usual hazards are storage of inflammable, poisonous or combustible chemicals, steam or gas-heated kettles, stills, vacuum kettles, stoves, pill making, dry boxes, extensive laboratory, label printing and pasting and large amount of packing material. Burn swiftly with heavy dark smoke.

MEETING RAIL—Combination of the lower rail of an upper sash and the upper rail of the lower sash of a double hung window.

MEGANITE—An explosive composed of nitro-glycerine and vegetable meals.

MELINITE—A powerful explosive.

MELTING POINT of metals. See Fusion Point.

MEMORIAL WINDOWS are part of the building and may form considerable of building loss in case of fire. Few companies will write them as separate insurance.

MEN'S FURNISHINGS—Susceptible stock. When colored goods are water damaged, the colors either run or goods become mildewed and prove total loss. White goods mildew but these can be washed. Included may be cheap jewelry which tarnishes.

MENTHOL—Resembles camphor. Obtained from oil of *peppermint by cooling*; volatile.

MERCANTILE BUILDING—One occupied by mercantile tenants such as those having stocks, offices and very light manufacturing.

MERCANTILE RATING—When the financial rating of a person or firm does not appear in any of the mercantile rating books it usually indicates lack of capital or credit; again it may only signify that the bureau has no information on which to base a rating. A good "credit" rating with a low capital is ordinarily better than a good "capital" rating and low credit. See Trade Reports; also Blank Rating.

MERCERIZED GOODS—Water will practically ruin stocks of this nature, which are also severely damaged by dampness.

MERCERIZING—A process which imparts a gloss or lustre to cotton fibres by treating the tightly stretched fibres with caustic soda, followed by washing and drying.

MERCHANDISE SPECIFIC FORM—In writing insurance under this form, add to the base rate of warehouse, the amount named in the alphabetical list. Specify the merchandise by name and if the rate is for a particular kind of package, mention the package. See Storage; see Warehouses. See Alphabetical List.

MERCHANTABLE—Fit for market; in sound condition.

MERCHANT POLICE—In place of the ordinary watchman, they are hired by owners of merchandise, to patrol on docks and piers, to prevent thievery. The merchant police are responsible for all goods lost and therefore are always alert.

MERCHANT TAILOR—Does custom work, making garments from piece goods, and may also have stock of ready made clothing. Good insurance if well established. See Custom Tailor.

MERCURIC CHLORIDE—Corrosive sublimate, heavy white salt, no fire hazard.

MERCURY is the only metal which is in liquid form. It is white, having a brilliant metallic lustre. Boils at 660 deg. F. Alcohol is used as a substitute for mercury in thermometers where very low temperatures prevail.

MERCURY FULMINATE—Produced by solution of *nitrate of mercury* and alcohol. Powerful explosive.

MESCAL—See Peyote.

MESCAL MAGUEY—A Mexican fibre. Classed as hard.

MESOTHORIUM—Is a substitute for radium. It can be used just as efficiently for radium as luminous paint, to which use radium is being especially put in the work on aeroplane dials, compasses and gun sights. Mesothorium can be obtained as a by-product in the treatment of monazite sand for the manufacture of thorium nitrate used in incandescent mantles. Mesothorium can also be used for cancer treatment but has a shorter life than radium.

METAL BEDS AND SPRINGS—Busiest season April to July, September to November. Metal working hazards including japanning and enameling. Use considerable excelsior for packing. (Poor fire record class.)

METAL CLOTH—Cloth through which metallic tinsel is woven (resembling fine strands of wire of varied colors). It adds lustre to the goods. Used for dress goods the same as any cloth.

METAL FLOWERS—See Flowers and Feathers.

METAL FURNITURE—Heavy losses are caused by combustible contents, such as desks, cabinets, etc. The modern concern now equip their premises with metal furniture. It will not burn.

METAL IN PIGS—Excellent insurance.

METALIZING—Dipping articles in molten metal.

METALLIC POTASSIUM (and sodium) are kept by nearly all drug houses. Should be kept in oil, because if water comes in contact with them, flames result, as the reaction releases hydrogen.

METALLIC POWDERS such as aluminum and bronze have a great affinity for oxygen and are considered dangerous. Many fires in these stocks. See Aluminum and Bronze Powder.

METAL PLATES UNDER STONE TREADS—All stairways should have metal plates under stone or marble treads as in case of fire, the heat is apt to crack and break the stone or marble and hinder the firemen by putting the stairs out of commission.

***METAL SIGNS* (Lithographed)**—Sheet metal working

with varnishing and painting hazard. Benzine thinned paint used in dip tanks. A roller varnishing machine is sometimes used with celluloid varnish. Dry rooms same as lacquer dry rooms. Poor fire record class.

METAL TUBING (Manufacturing) embraces the hazards of gas-heated brazers, roller mills, stamping presses, swaging machines and heavy metal-working machinery. Floors usually oily and greasy. Fair fire risks.

METAL WORKERS—Machines used are lathes, shapers, milling machines, drill presses, emery wheels and similar devices. If the floors are of wood, the machines should set on metal with edges curbed to prevent oil soaking into the wood. Waste used around machinery when oily should be kept in self-closing cans with legs so that the bottom of the can is off the floor. Iron filings should be kept in similar receptacles. Some shops do lacquering or japanning. Only a day's supply of such materials should be kept on hand in the building. Dry rooms for lacquered parts should be standard in construction. Good insurance risks.

METHANE—Marsh gas—See Fire Damp.

METHYL ALCOHOL (or Methylic)—See Wood Alcohol.

METHYLOXALIC ACID—Is recovered from the products of dry distillation of wood; inflammable.

MEZZANINE FLOOR—A gallery or half floor, of smaller area than other floors of the building.

MICA—Manufacturing such goods as electrical insulators, lamp chimneys, etc. There are but few plants in the United States. The stock of mica is received in rough state from mines, cut up into small pieces, worked up into several layers using shellac as a cement, pressed into sheets by hydraulic presses, dried in ovens, cut to size, formed in steam moulds. They are gradually cooled in these same moulds by circulating water jackets, then dried in ovens, edges trimmed with jig saws and surface ground down on carborundum wheels, and the seams cemented with shellac. When put in ovens to dry, the mica is placed on a sheet of metal previously oiled. Metal parts are riveted on by foot power presses. Hazards embrace light metal working, *machine shop for* repairs, storage of shellac and alcohol, dry-

r ovens, steam pipes at mould tables in contact with wood. ood insurance risks.)

MICALITE—A substitute for sheet celluloid. Non-in-mmable.

MICE—Have long been credited with causing fires and al-ough experiments with mice and matches have been un-ccessful, the following is a true report of a concrete case: fire was discovered under a floor in a residence. A large antity of water was poured in. When firemen arrived they ok up the floor boards and discovered a large nest between e beams and in it were acorns, chestnuts, pieces of cloth, ambers' waste, cheese, and—half of a burnt match. See its.

MILDEW may appear on wet fabrics if not handled omptly, particularly in hot weather, or if in steam-heated emises. Various kinds of vegetable products, if wet, will ildew unless promptly handled and dried. For instance, een coffee in the berry if wet can be roasted and all ad-tional damage thereby stopped. The same is true of grain all kinds. White fabrics can be re-laundered but if al-wed to stand until mildewed, spots are liable to appear in e goods.

MILK DEPOTS—High pressure boiler hazard, which sup-ies steam for pasteurizers, sterilizers, bottle washers and ry rooms. Crate or box-making for bottles, tinsmith shop r repairing cans, refrigerating machinery, printing labels nd caps are hazards found at some plants. The fire record not very good. See Dairy Farms; see Creameries.

MILL—A building fitted up with machinery requisite for a ictory. From the material or substance that they operate, e., Bone mill, Cider mill, Feed mill, Lead mill, Oil mill, etc.

MILL AGENT—An agent who sells the product of mills the trade, receiving a commission for same, although oods are shipped and billed direct to the buyer from the ill.

MILL CONSTRUCTION—Briefly, mill construction em-races the following: (1) Consists of making a fire stop of eavy plank between stories so that the spread of fire may e retarded. This necessitates doing away with all openings

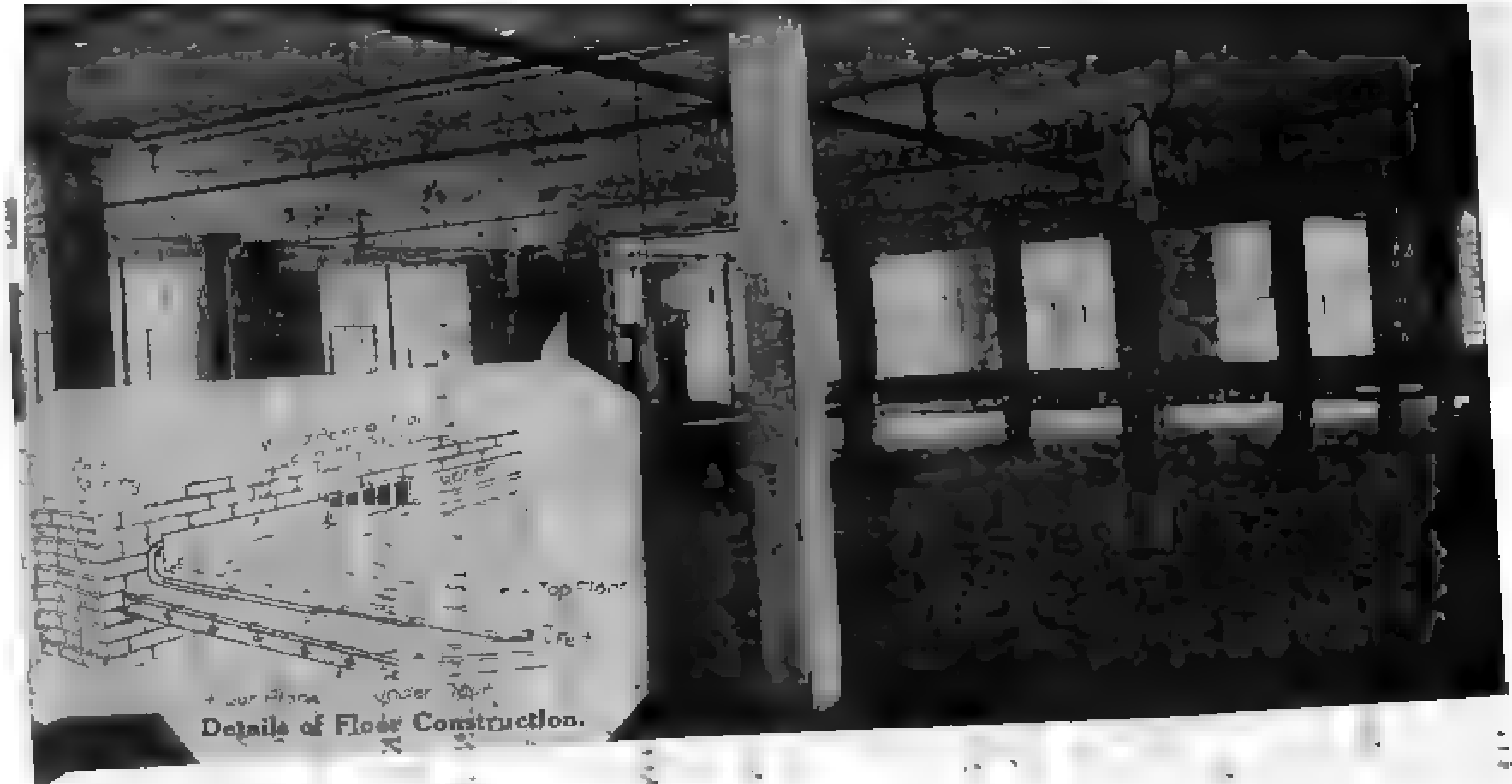
in floors such as belt holes, stairways, elevator wells, or all such must be in cut-off towers. (2) The timbers and flooring required to give the necessary stability and strength are arranged so as to offer as smooth a surface and as few corners, on which fire may feed, as practical, also doing away with all concealed spaces in walls or floors. This is accomplished by using very heavy floor timbers spaced 8 to 12 feet apart and floors of 3 to 4-inch plank with single or double top flooring with waterproof paper between. Roof to be 3 inches thick and covered with gravel or tin. In a building of this character fire can be readily reached with water from either hose stream or sprinklers. (3) Floors must be tight as well as heavy so as to prevent fire, smoke or water from working through. This is one of the most important features of a mill building and one to which sufficient attention is not paid. Due to poorly seasoned plank or poor workmanship openings are left around posts, at side walls or elsewhere and fire, smoke or water spread through these openings destroying or impairing the efficiency of the floor. See Bay Construction; see Compromise Mill.

MILL WASTE—Odds and ends from fabric mills, macerated and bleached to obtain a resemblance to cotton.

MILLINERY is liable to include almost anything from a delicate chiffon to a stuffed bird, but can be counted on to give practically 100 per cent loss in nearly every fire, because the salvage, once the stock is smoked or wet, is practically nil. A moral hazard is present when there is considerable left over or unseasonable stock on hand.

MILLINETTE VARNISH—Used for stiffening straw hats. Mainly composed of copal gum and alcohol. Thinner is mainly alcohol with about 5% benzole.

MINE FIRES are caused by ignition of timbers, wooden stoppings and brattic cloths, hay or oil-soaked material near open torches, the ignition of coal by blown-out shots, or explosions of fire damp or coal dust, or the improper use of explosives; surface fires communicating to the mine through the shaft or tunnel, underground furnaces and boiler plants, ignition by friction on oily wooden rollers or rope haulageways; fires occasioned by spontaneous combustion of coal,



Courtesy National Lumber Mfrs. Assn.

Modern mill construction showing bays, heavy floors and automatic sprinklers.

timber or greasy waste. Most effective means of exploring and combating fire is the oxygen helmet.

Mine Fires spread rapidly. Unless extinguished within a few minutes from the start, the closing of the section or mine often becomes necessary. Mines should be patrolled by lookouts and employees, especially English-speaking, and the more intelligent should be organized into a fire brigade for instant service. (H. M. Wilson.)

MINERAL BURNING OIL—Obtained by the fractional distillation of crude petroleum and shale oil.

MINERAL INDIA-RUBBER NAPHTHA—Produced during the process of refining tar by sulphuric acid.

MINERAL LUBRICATING OILS—See Hydrocarbon.

MINERAL OIL FOR MEDICINAL PURPOSES—Petroleum oil products and Russian white oils are used. Work in compounding risks, include mixing the oil with Fuller's earth, then refining, distilling, filtering, all by steam heat. Barrelling, bottling, labelling, painting barrel heads and chemical laboratory for testing. Premises usually very oily.

MINERAL OIL REFINERIES—The principal hazard is the presence of naphtha in the crude oil in the first acid-and-soda treatment.

MINERAL OILS are usually products of coal tar and petroleum. They are considered more hazardous than the animal or vegetable oils. The most important thing to know is the flash point. If not mixed with vegetable or animal oils, are not subject to spontaneous combustion.

MINERAL TURPENTINE—Trade name for a substitute turpentine. Inflammable.

MINERAL WATERS AND BEVERAGES—Work consists of making flavoring extracts, charging or carbonizing water with marble dust, straining, filtering, bottling, labelling, packing. Use steam or gas-heated kettles, steam-heated bottle-washers. Bottles are packed in excelsior or straw jackets. Good insurance risks if hazards are safeguarded. See Bottlers.

MINERAL WOOL—The product obtained by forcing a jet of steam or air against a stream of molten slag or molten *rock.*

IIMUM RATE—Applied to the preferred classes such ellings, stores and dwellings, etc., while are not subject :cific rating.

RBANE OIL—A purified benzole mixed with nitric Extremely volatile and inflammable.

RROR BACKING—An amalgam of mercury and tin. oil, i. e., tin leaf, is first applied over the glass, then ıry is poured upon this, and it unites with the tin, mak- ı amalgam. Nitrate of silver, turpentine, salts and dis- water are also used. Silvering tables are steam heated.

RRORS—(Electroplating Mirrors)—A new method of ing mirrors consists of depositing the metal on the glass eans of a high potential electric current. Electrical d.

SREPRESENTATION—The policy reads that the shall be void if the insured has concealed or misrepre- d any material fact or incumbrance concerning this ance or the subject thereof or in case of any fraud or swearing by the insured touching any matter relating is insurance or the subject thereof whether before or a loss.—G. S. King.

TRE SAWS—Used by woodworkers to cut any kind of s at an angle.

XED ACIDS—Mixture of nitric and sulphuric acids. contact with organic matter will cause fire.

XED FABRICS—Those composed of more than one of material, as wool and cotton.

)HAIR—The hair of an angora goat. Used as a dress :.

)ISTURE is a factor in nearly every known case of taneous ignition and the amount of heat generated is :ly the same in slow, as in rapid, combustion of equal tities of material, but in slow combustion it is unnotice- Various substances have an affinity for oxygen and :hemical action is therefore more rapid in some mix- than in others. All vegetable oils will cause spontane- gnition if it has the property of drying by reason of ab- *ng oxygen, and animal* oil will do likewise if it has

the property of becoming rancid. Its presence usually increases the chance for spontaneous combustion.

MOLASSES DEALERS make rock candy at times using steam vacuum kettles. They may also have benzine for thinning paint for barrel heads.

MOLASSES TANK EXPLOSION, Boston, Jan. 14, 1919. Evidently resulted from gas fumes generated by fermenting molasses within the tank which was not full and not properly ventilated. The molasses had been kept warm by steam heat from a plant some distance away. The tank was of two million gallons' capacity and of steel construction. A dull, muffled roar gave but an instant's warning before the top of the tank was blown into the air. All tanks should be vented.

MOLASSES WASTE LIQUID—Used in fertilizer. The waste liquid derived from molasses contains about 60 per cent water and 40 per cent substance. The body portion is now reclaimed by the following process: Waste pumped into large wood tanks, then to steam-heated still evaporators with condenser apartments. The heavy liquid is then run into large storage tanks, and then flowed to a hopper, into which ground phosphate is added. It is then mixed and dried. Considered non-hazardous if fuel oil system for dryers is approved and no grinding of phosphate on the premises. Molasses-soaked floors burn fiercely. Fair insurance risks.—F. W. Mayes.

MOLINITE—A new explosive prepared with picric acid.

MOLLACH—A benzine-thinned stain used by leather goods manufacturers.

MOLYBDENITE—Ore of molybdenum which is used to give hardness to steel.

MOLYBDENUM is an alloying metal, rather rare and costly, but a little of it goes a long way. It is never found free in nature, its compounds appear to be fairly well diffused throughout the earth's crust, but its ores are rarely found in mineable quantities. Five per cent to 10 per cent put in steel raises the elastic limit, increases the tensile strength and gives greater toughness. It is used particularly in heavy artillery, rifle barrels and for tools.

MONEY—Cannot be insured under the standard policy orm.

MONITOR—A raised roof structure of various shapes and zes, with glass sides. Sometimes called "Texas" or "Lantern Skylights."

MONOLITH—A single piece or block of stone, as a single piece stone column.

MONOLITHIC CONSTRUCTION—An all reinforced oncrete building.

MONO-NITRO COLORS—See Dyes.

MONO-NITRO COMPOUNDS are not necessarily dangerous.

MONOTYPE MACHINE—Used by printers for casting nd setting up lead type in single letters. First a key board used, where the different styles of type, spacing and alignent are indicated by perforating a roll of paper. This aper roll is put in the casting machine. Air pressure blowg through the perforations of different sizes and spaces egulates the machine operation so that the lead type is utomatically cast and set up. Usually motor driven. The ad pot should have rigid iron connection, and floor under achine should be metal clad. See Printers.

MONTAN WAX—A soft coal distillate from Austria; elts at near 180 deg. F. Used in the manufacture of cable nsulation. Not hazardous.

MONTEJU TANKS—Used in color works are iron cylinrical tanks without heat. The liquor from settling tanks uns by gravity into these tanks and air pressure is applied hich forces the liquid to the filter presses.

MONYLENE—A liquid hydrocarbon. Inflammable.

MOPS—Prof. John H. Bryan, principal of the Ward chool at Marion, Ohio, on several occasions found mops sed by the janitor in oiling the floor burned to ashes, it eing evident that the building each time narrowly escaped eing burned. To prove the nature of the trouble, he aturated several mops with the floor oil and hung them here there were no inflammable surroundings. A mop aturated with oil at 5 p. m. was found to be very warm at a. m., and in one instance he watched a mop until it burst

into flames. It is claimed that the ill-fated Collinwood school fire may have started in this manner.

MORAL HAZARD—What is that intangible, but important, part of a fire risk which is commonly called the moral hazard? It exists in other lines of business, and, in fact, it is omnipresent in all vocations where financial responsibility is involved, and is frequently a synonym for a form of dishonesty. If we hear of a bank or a stock broker or a merchant who is dishonest we frequently describe his condition as overburdened with "too much moral hazard." Consequently we must understand at the outset that moral hazard is a risk which to a greater or less extent permeates all kinds of business. It is the same as short weights in the grocery, or coal yards; it is the same as misrepresentation in merchants' transactions or downright fraud in manufacturing, or any other dishonest proceeding to deceive the public on the part of the man who has something to sell and finds a market among the innocent purchasers. In the majority of cases there are some ways of discovery and detection, and often of punishment, but in fire insurance the moral hazard risk goes down much deeper because it is a long-drawn-out process of crime which may be conceived months or years before it is actually committed, and it is more generally suspected than proved. It is, however, sometimes confirmed by circumstantial evidence, but even then the victim has no redress. It is intangible because we have to search into the inner motives of man and go below the surface before finding any important proof. Attempts to describe it in general terms have often been made, but the difficulty of a description applicable to each case is increased by the fact that no two instances are precisely alike. . . .

There are certain questions which should be answered by the agent, or which he should answer for himself, which will assist him materially in forming a correct judgment whether the insurance seeker is a safe subject for the company:

1. Has the applicant been long established in business in the place? If not, is he a resident or a newcomer, and if the latter, where was he formerly located, and why did he *change?*

2. Does his business appear to be prosperous? Has he good local credit? Have any of his notes been protested by the local banks? Has he ever failed, and if so, upon what terms did he settle with his creditors?

3. Was he ever burned out? Where and how did the fire originate? Was he insured, and if so, did he have any trouble in settlement with the insurance companies? Are the same companies willing to insure him again? An inquiry addressed to your head office will often bring out this information, which is inaccessible at your own residence.

4. Is the insured a woman? Or is the active manager doing business as agent for his wife, and if for another, for whom? Has the present owner or manager of the business ever been connected with anyone who has suffered from fire?

5. Is the business of a declining class? Are the premises poorly located in the town for profit? Is the building out of repair? Has there been any difference with the landlord, and is the owner of the building a desirable person to insure?

6. Has the applicant suffered from strikes or differences with labor unions, or been publicly or privately threatened with damage by strikers or discharged workmen? . . .

The companies as a rule dislike to insure property in the name of a woman unless it be one of the small stocks which may properly be managed by her sex, such as a retail haberdashery or a dressmaking stock. But the trouble with a woman in the case lies in the probability that she is being used as a mask for somebody else. It is surprising how many cases turn up where, by the use of a woman's initials only, companies are deceived by the supposition that it is a masculine whom they are insuring. I know an examiner for an important city company who invariably sends out an inquiry when initials only appear for the full name of the person or persons insured. He uses this form of query: "Is the insured male or female? If a female, is she married, and if so, what is the full name of her husband? If a widow, please state the fact." This examiner once told me that in the course of five years he had turned down several daily reports because he learned that the insured was of the

feminine gender, and what is still more remarkable, at least one in ten of the risks on which policies had been canceled for this reason had subsequently burned. Probably this should be called a "suspected moral hazard" in which the woman is not directly to blame, and if the whole truth were known it would be found a man profited by the loss of such a risk far more than the woman whose name was used as a cloak for the man's insurance. These instances are easily connected with incendiarism, and I have no doubt that many of them belong to some of the worst classes of moral hazard which have ever come to light.

I presume you will be surprised when I assert that there is a new kind of moral hazard affecting the business of fire underwriting now in vogue quite unknown twenty-five years ago. I mean a sort of reverse action of the moral-hazard principle succeeding a fire quite apart from its origin. I believe the experience of the last twenty years has demonstrated that many an honest loss has been turned into a dishonest loss by the temptation, or whatever else you choose to call it, to indulge in crookedness directly aroused by the fire. Somehow the underwriters are often treated as easy marks who can be plundered by fraudulent claims and robbed of large sums by schemes to cover up the real loss with a layer of fraud which sometimes escapes detection. I believe that the discovery of such schemes is generally possible through patience and perseverance, as well as by skillful handling of the testimony. Some very remarkable evidences of this kind of moral hazard have been gathered by our loss committee, and the former manager, Mr. Robb, could, if he would, tell you of one very extraordinary case in the surrender of policies for a large amount upon a stock of plate glass in this city without any payment at all, after a most elaborate scheme of fraud had been prepared which was exposed by accident. One of the links in the chain was weak, and that broke down all the connecting links. I am obliged to withhold the particulars of this case, but I believe it was one where the rascality really followed the fire.

The temptation to swell loss claims sometimes overtakes men who are esteemed honest and upright in all the walks

f life. The peculiar view which some people hold regarding he value of their property after the damage frequently leads to downright perjury, a phase of moral hazard which is generally created, promoted, suggested and carried forward by the new profession known as the public adjusters. I wish it were possible to take up the record of every loss handled by public adjusters in the last ten years. The revelation would, I am sure, astonish you. (Samuel R. Weed, in the Weekly Underwriter.)

Moral Hazard—The moral hazard of a risk is most pertinently described by Colonel Ducat as "the danger from friction caused by high insurance and low depreciated stocks and property coming together. And just the difference between what would have been the fire loss with no insurance and the fire loss under insurance would be the moral hazard of the risk."

MORDANTING—Means fixing the colors of the dyes when dyeing certain kinds of goods by the use of intermediate substances known as mordants.

MORTGAGEE CLAUSE (full contribution)—This clause is usually placed on policies covering the second and third mortgagee's interest. The object of this clause is to make all policies contribute their proportion of loss in case of fire. If the insurance company controls the insurance for the first mortgagee, the full contribution feature may be omitted.

MORTGAGE INTERESTS—The New York Standard Policy states: If loss or damage is made payable, in whole or in part, to a mortgagee not named herein as the insured, this policy may be cancelled as to such interest by giving to such mortgagee a ten days' written notice of cancellation. Upon failure of the insured to render proof of loss such mortgagee shall, as if named as insured hereunder, but within sixty days after notice of such failure, render proof of loss and shall be subject to the provisions hereof as to appraisal and times of payment and of bringing suit. On payment to such mortgagee of any sum for loss or damage hereunder, if this Company shall claim that as to the mortgagor or owner, no liability existed, it shall, to the extent of such payment, be subrogated to the mortgagee's right of

recovery and claim upon the collateral to the mortgage debt, but without impairing the mortgagee's right to sue; or it may pay the mortgage debt and require an assignment thereof and of the mortgage. Other provisions relating to the interests and obligations of such mortgagee may be added hereto by agreement in writing. Except in special cases, the interest of the mortgagee is not insured direct or separate, but is covered by the usual mortgage clause.

MORTISE—A hole cut in one piece for receiving the tenon which projects from the other piece. A chisel mortiser, by repeated thrusts, produces the desired hole.

MOSS—See Upholsterers' Moss.

MOTION PICTURE BOOTHS—Usually built of asbestos lumber ¼-inch thick on 1¾ by 1¾ and ¼-inch angle iron frame. Iron booths are now obsolete. Where the equipment is permanent, tile or brick is used. Shutters should close automatically. **Ventilation:** metal pipe should extend to outer air (not to attic). **Hand-operated machines:** the operator is always at the machine and therefore can readily detect any mechanism which might go wrong. If the machine is electrically driven, it may run wild, the film become clogged, and before the operator could shut down the machine many feet of film may be burned. Machines should be fastened to floor to prevent tipping them over. **Automatic shutters** on machines are to shut off rays from the arc lamp when machine stops and thus prevent ignition of the film. The upper magazine in the machine holds the film being shown which is run through a thin slot to a lower magazine where it is wound up. These slot openings are just large enough to accommodate the film. Arc lights at machines should be enclosed in metal box lined with asbestos. **Careless operators** are responsible for most of the fires in picture booths. Extinguishers and sand pails are required in booths.

MOTION PICTURE FILMS are made of nitro-cellulose. Non-inflammable films are made of cellulose acetate. Those of the pyroxilin type when stored in poorly ventilated vault are apt to decompose and the gas arising, when mixed with air, will explode if ignited. The master film (original nega-

e) is very valuable, especially before copies are made. metimes one film will exceed in value the entire contents the studio. The values run up to half a million dollars r a single film.

Vaults for Films—Sizes are regulated by city ordinances t should not exceed 750 to 1000 cubic feet. In buildings ordinary construction, the walls should be 16 inch concrete 20 inch brick, roof 4 inches thicker than wall, and floor least 12 inches thick. All vault walls piercing floors should continuous and independent of building walls. Doors to ults are usually in pairs, i. e., with vestibule or entry tween them. The outer door should be eight inches thick ntaining three inches of concrete and the inner door ie-half inch steel plate with locking device. Vaults as ually found in motion picture exchanges or studios should : at least five inches of concrete or nine inches of brick ith similar floor and roof and standard door. These are dinarily constructed on each floor singly or in multiple. Pressure Relief Vents should open directly to the outer r and extend above roof of building through a separate ack at least five inches thick and shielded at top. The ective sectional area of opening should be at least 70 uare inches for each 100 reels (500 lbs.) of film capacity. ie vent should be protected against the weather by 1/16 lored glass although some "Codes" require only a wire esh. No other ventilation is permitted, except a fan awing air through a vent of four-inch fireproof material to e outer air when absolutely necessary. All fixtures in ults should be of incombustible material. All lighting in nduits and lights enclosed in vapor proof globes with wire ards.

Safes—Size shall not exceed 150 cubic feet. Safes shall ve an angle iron frame at least ¼ x ¼ x 2 inches and ntinuous at all edges. On safes larger than 40 inches high, inches wide, and 30 inches deep, an additional stiffening heavy steel at least ¼ inch thick, and of width propor- oned to size, but never less than 2 inches, shall be used at p, bottom and sides. Sheet steel plates shall be not less an No. 12 U. S. gauge for the outer shell and not less

than No. 14 for the inner shell. Filling shall be of cement concrete or its equivalent not less than 5½ inches thick, except that the doors may have at least 4 inches of concrete with a sealed air space for the lock and bolts. Door shall have stepped sides so as to be smoke proof. No cast iron shall be used in the construction of the safe, except such parts as casters, hinges and flanged door frames. Other containers of no more than 150 cubic feet capacity and approved as the equivalent of above described safes may be accepted in lieu thereof.

Cabinets—Capacities are usually limited to 10 cubic feet, or to accommodate not over 200 reels of films.

Cabinets shall be tightly enclosed and may be made of suitably stiffened sheet iron at least No. 18 U. S. gauge, in thickness, double walled with 1½ inch of air space; doors shall be constructed equivalent to walls of the cabinet, shall be self-closing, fit closely and be kept locked.

Other containers having a capacity not exceeding 50 reels of film each and approved as the equivalent of the cabinets may be accepted in lieu thereof.

Some "Codes" permit cabinets to stand on legs if at least 6 inches high, but they are preferably built directly on fireproof floor so that refuse cannot lodge under same. Ventilation may be by a riveted sheet iron pipe not over 9 inches diameter, covered with at least one inch of fireproofing material and opening directly to the outer air and above roof. Cabinets should be only used when a standard vault is impracticable.

MOTION PICTURE FILM EXCHANGES are distributing offices where films are received from theatres and exchanged for others. There may be film repairing, examining and projecting rooms. (Poor fire record.) For hazards of repairing, joining, cementing and projecting see under Motion Picture Studios.

MOTION PICTURE SHOW HOUSES—Note if building is specially designed for this purpose or a converted building, the construction and cleanliness of booth, heating apparatus, lighting system, care of scrap films which are produced when reels are re-joined after breaking, location

e-winding room for films. The ordinary picture show ling is a high one-story structure and may embrace the tre hazard by having a wooden stage for vaudeville perances, wooden dressing rooms and a quantity of scenery. d insurance if building specially designed for motion ures.

OTION PICTURE STUDIO—Usually consists of a ip of buildings varying in size and construction and comicating with each other. In some, the different departts are in separate buildings or sections; while in others, dressing rooms, scenery storage and painting, studio carpenter shop may be under one roof. The stage and equipment is usually of a portable or knockdown type. least one side and the roof of studio is glass. Neither d glass nor glass with screens can be used for studio ts because the wires would show on the picture if taken natural light.

aboratory Process—Films received in metal cans, washed enzine, sensitized in glycerine bath. The picture is taken developed in bath of hyposulphate of soda and hydroion, glycerine and water and a thin solution of water mercury, then air dried. Printing is done in a high d, all metal, electric power printer. An incandescent t is in an enclosed cylinder in center of printing machine a small aperture to transmit light. The negative and itive films are on open reels and pass through a thin about five inches from the light and wound on reels erneath the printer. The film is then perforated, i. e., a of small holes is made down each side of the film which he cogs on a reel on which the film is wound. Perforatare high speed, electric power machines, equipped with uction pipe to carry off the dust created. The small icles are dropped through bottom of machine to a metal The joining of sections of film is done by hand, each ker having a small bottle of cement. The films are then shed on reels on which are fastened flaps of felt saturated alcohol and operated by hand. They are then projected ugh a moving-picture machine to detect inperfections. moving-picture machine is sometimes called a project-

ing machine.) Special laboratory work consists of making a cement for joining films composed of carbonate of potassium, collodion, amyl acetate, acetone, iodide potassium, sulphuric acid, ethyl acetone and sulphuret potassium and only a day's supply of cement should be kept inside the building. Joining, printing, developing, perforating, polishing, cleaning, property rooms, carpenter shop, painting, laboratory and projecting should be in separate rooms Rubber-covered floors are used a great deal to prevent nails in heels of shoes producing sparks and setting fire to film scrap on floor. All electric lights should have vapor-proof globes and wire guards. Care in disposal of film scrap is very important.

Printing, Developing, Examining, Repairing and Exchange Rooms shall have outside ventilation and be separated from each other and the balance of the building by tight partitions of fire-resistive material, with self-closing fire doors of the corridor type at communications, partitions and transoms. Doors should contain no glass other than wired glass.

Such rooms shall be used neither for storage nor handling of combustible materials, other than the films. The furnishings should be of incombustible material.

The number of reels of films not in metal cans shall be limited to 20 in a single room at any one time. The number of reels of film in the examining and repairing room awaiting attention shall be limited to 10 for each operator; provided all such reels except the one under examination or repair be placed in an approved double walled No. 20 U. S. gauge metal box with at least ½ inch air space between walls. A box otherwise constructed and equivalent to the above may, by special permission, be accepted in lieu thereof. Sides of box shall extend at least 6 inches above top and beyond front and rear of box. Covers shall be self-closing and of a construction equivalent to the walls of the box. Boxes shall be separated from each other at least three (3) inches. All **furnishings** should be of metal.

Rooms having more than 20 films not in metal cans during rush hours shall be subdivided by partitions of fire-resistive *material* with self-closing fire doors of the corridor type at

nünications so as to limit the number of reels outside etal cans to 20 in each of these subdivisions.

rap and Waste—All scrap or waste shall be kept under r, in self-closing standard, metal waste cans or their ʳalent, and removed from the building at least once each to a safe location; such waste to be kept separate from r, waste or other rubbish.

ment—Any compound of collodion and amyl acetate or arly inflammable cements inside the building shall not ed the quantity required each day, and shall be limited to gallon.

ating—Overhead steam pipes or hot water circulating s should be used. If built at floor, they should be :ned, with sloping surface so as not to be used as ʳes. Hot air registers, especially in floors, are poor fea-, as scraps of film may enter the hot air pipe or register.

tional Association of the Motion Picture Industry, Inc., :

Keep plenty of water handy. (a) In an automatic sprin-system suitable to your conditions; (b) In convenient ets; (c) In faucets with an inch and a quarter hose and le attached; (d) Have fire extinguishers, which every- is shown how to use; (e) Keep sand pails handy. Sand stop a small film fire quickly and will not damage the r.

Keep film in containers when not actually in use. The lost in replacing it is nothing. Naked film is the one ition that guarantees that a little fire will get beyond :ol in a few seconds.

Throw film scraps into self-closing metal cans, never open waste baskets.

Keep the cutting rooms, etc., well swept. The tiny :s of film that fly about make the dust as dangerous as uch gunpowder.

Have a professional electrician do all your wiring, in rdance with every city ordinance, no matter how "un-)nable" it seems. Have the light globes caged—a broken e may *make only one* spark, but that can ignite $1,000

worth of film. Handle no film by any artificial light but electricity.

6. Box your radiators and steam pipes. The film that touches a hot pipe and crinkles up might just as easily have burst into flame.

7. Enforce the "no smoking" rule. Give the boys a smoking room if they need it, and make the boss and his guests who are looking over the place leave their cigars, cigarettes and pipes outside, as they would if they stepped into a theater for a glimpse of the picture.

8. Banish the "strike anywhere" match. Furnish boxes of safety matches free, if necessary. But don't have anything that will light except when it is intended to.

9. Keep only enough cement, gasoline and collodion on hand for the day's work. They are all highly inflammable, and should be stored where they can do no harm.

10. Appoint one man or woman as fire monitor, and let them know it is all their job is worth to fail to call down the boss, the cutter, or the office boy for any carelessness.

Bad housekeeping and carelessness—Unguarded radiators. Unprotected electric light globe over film. Electric wires wrapped around steam pipe. Film scrap on floor. Lengths of film on floor. Willow waste basket used. Film on fire extinguisher. Too much film on each table. Film not kept in cans. Smoking. Waste paper and newspapers on floor. Posters in same room with film. Lack of order and cleanliness.

Motion picture studio fire, 226-32 West Thirty-fifth Street, New York City, Jan. 3, 1917. The tables on which the films were joined or examined, had an electric light in them, located in a well and covered with a heavy piece of glass. The glass cover in one of the tables was very loose fitting, in fact, it was not the original glass made for the opening. While an employee was joining a reel on this table, the electric light globe broke. It is thought the heavy glass cover fell on the globe, and as a result the film on the table caught fire. Some of the employees tried to put the fire out by throwing the film on the floor and stamping on it, but were not successful. The flames ignited other films

the vicinity, some of which were not in cases. There re about 59 reels, part in cans, a few of which were in a gle wall metal cabinet at the time of the fire. The fire ead over the entire rear mezzanine on the second floor, f and main part of the studio and filled the premises h an irritating dense smoke. Some of the employees had iculty in getting to the street, due to the smoke. The portance of segregating motion picture studios and facies and the necessity for automatic sprinklers in connecn therewith was illustrated by the fact that the contents this film department furnished exceptionally inflammable l to the fire. This fire would seem to justify the regulans of the fire department requiring a special permit and id safeguards for the storage of inflammable films in ess of five reels (5,000 feet), the practice of having electric its on the film tables, should be discouraged as much as sible. The danger may be somewhat reduced by making heavy glass over the top of the light well permanent; o the bottom of the well should be removed so no pieces film can lodge around the electric light globe.—(New rk Board Report.)

MOTOR BOATS—See Yachts.

MOTOR CYCLE AND BICYCLE REPAIR SHOPS—ually located in basements or on grade floors, with apartnts above. Sometimes do painting, enameling, vulcanizing, aning with gasoline and have a large stock of acetylene cylinders for sale; a stock of automobile accessories, luding celluloid articles, and a gasoline supply station. chine shop hazards, with oily floors. These places are netimes used as "hang-outs." Poor fire record.

MOTOR GENERATOR—A combination of motor and namo. The shafts of each are coupled together, so that en the motor shaft rotates it will turn the dynamo shaft.

MOTORS should be enclosed to prevent foreign matter ning in contact with them. The boxes should be lined h zinc or asbestos and kept clean. Oil pans under same l prevent oil from saturating floor.

MOTT KETTLE—Large iron pot used for boiling or mix-, standing usually on 4 or 6 legs. Fuel may be coal,

wood, oil or gas, and fire pot with light iron base is under kettle. Floor under and in front of kettle should be well protected. Floor protection should have flanged edges so that if contents of kettle boiled over, the floor would be protected.

MOVING BUILDINGS—Buildings that have been moved should always be inspected to ascertain if the walls have been weakened or if the chimneys have been cracked.

MUCILAGE—Ordinarily made of gum arabic boiled in water and perfumed with essential oils.

MUFFLER—A type of gas stove with a hooded top to retain the heat. Used to heat soldering or pressing irons.

MULE—A long iron frame spinner used in silk mills.

MULL—See Madder.

MULLIONS—Upright bars dividing a window into two or more lights.

MUNGO—Obtained by "deviling" the rags or remnants of fine woolen goods.

MUNITIONS are not necessarily the same as ammunition. Usually denotes war material with the exception of explosives.

MUNITIONS PLANT FIRES—The growth of the munitions business has resulted in greater precautions for safety being taken in many factories, that were not operated with success prior to the war. They have since become successful, thus minimizing the moral hazard. Overtime also has a tendency to minimize the risk, inasmuch as when work-people are on the premises all the time any incipient fire is more likely to be arrested before actual damage is done. The following are features of the report: prolonged hours of labor, night work, etc., have increased the period of action of the active special or manufacturing hazards. A tendency toward uncleanliness has been created or enhanced by long hours of labor, the difficulty of obtaining satisfactory help, the increased congestion of equipment and material, and, above all, by the failure of superintendents, through pressure of other business, to give attention to matters of housekeeping. The introduction into established risks of *new manufacturing* or special hazards or processes. In some

cases there has been failure to protect these in a satisfactory and permanent manner on the assumption that they were of a temporary character. In other cases there has been failure to realize the true nature of the hazard involved and ignorance of protective measures.—(Weekly Underwriter.)

MUNTINS—See Mullions.

M-ROOF—A double roof shaped like an M and consisting of two peaked roofs side by side.

MUREXIDE—Purpurate of ammonia—made of the uric acid of guano.

MURIATE OF TIN—See Stannic Chloride.

MURIATES—Salts produced by neutralizing muriatic acid with a base. Not hazardous.

MURIATIC ACID—See Hydrochloric Acid.

MURIATIC ACID VAPORS will extinguish fires.

MUSHROOM CONSTRUCTION—See Floor Arches.

MUSHROOMING—A term used to express the action of fire which travels up a shaft in a building and spreads out on the upper floor. A mushroom fire generally destroys the roof.

MUSIC HALLS—See Theatres.

MUSIC STOCKS—Sheet music stock is very susceptible to water damage. Large percentage of the stock is usually obsolete or out-of-date.

MUSIC STUDIOS—Practically only a dwelling hazard if in connection with same. Specific insurance should be written on the instruments. Good insurance risks.

MUSICAL INSTRUMENT FACTORIES include wood and metal working and varnishing hazard. Poor fire record.

MUSTARD FOR TABLE USE is ground wet in burr mills, mixed with spices and vinegar and bottled. The hazard is mild.

MUSTARD OIL is pressed from seeds by hydraulic press after crushing and grinding; it is then filtered. All machinery and woodwork becomes very oily. The grinding of mustard seed is not as hazardous as the grinding of mustard after all oil has been extracted.

MUTUAL INSURANCE—The chief objection to Mutual Insurance, *in our opinion*, is owing to the Contingent Liabil-

ity imposed upon each insurer, which extends many years into the future, and the inability of an insurer to retire from such a Company and be relieved from the responsibility incurred while a member. **Stock Insurance Companies** charge a fixed rate of premium (agreed upon in advance) for the risk carried, thereby making the cost definite, and, without further liability on the policy-holder's part, pledges to the fulfillment of its obligations all its resources as well as the reserves and deposits required by law.

MYRABOLAMS—Nuts covered with a mucilageous substance, used by tanners and dyers.

N

S OR SCREWS packed in kegs may suffer severe mage. In order to get a fair amount of salvage, they thoroughly dried at once to prevent rust. Galvanized es greater salvage.

D LIGHTS—See Inflammable Vapors.

S—Business in Women's Name—A business may be nan's name for any of the following reasons: She widow or unmarried, divorced or a "grass widow"; and may have broken a lease, and to avoid suit transe business to her; a judgment may have been against her husband and to avoid payment, transe business to her; failures of husband; husband e a bad fire record, or, owing to manner of conusiness, credit is denied him by the trade. Instances n where the husband has sold a business with the hat he would not engage in the same business as itor to the purchaser, but has started up a business petitor in his wife's name. The wife or other female nay have furnished the capital or owned the business arriage; it may be a woman's trade, such as corsets s' wear, the wife conducting the business and the being employed elsewhere. See Moral Hazard; eigners.

INS—This stock is little affected by water damage ildewed.

THA, GASOLINE, BENZINE or other fluids **nit inflammable vapors below 100 deg. F.** should be itside of buildings in steel tanks, buried at least two w ground, or otherwise isolated. In printing estab- permission is given by local boards of underwriters *hese materials* above ground outside of building in

an approved safety can not exceeding five gallons' capacity if the can is placed in a metal, ventilated box, or on a permanent shelf, securely fastened to the wall outside of the building but not directly in front of a window; the shelf to be of metal, provided with guard rail, so that the can cannot be readily dislodged by accident. The box will fulfill the requirement for a guard rail. The law prohibits using fire-escapes for storage of such inflammables. Naphtha, etc., should be used in the building from approved safety can and kept outside on a shelf, nights, holidays and Sundays. A box of sheet iron, under lock and key, or other incombustible material, is recommended as a protection from the weather. See Petroleum; also Inflammable Liquids; see Inflammable Vapors. See illustration, page 318.

NAPHTHA CEMENT—See Rubber Cement.

NAPHTHALENE—Coal tar camphor; white crystalline solid. Usually kept in wooden barrels. Not hazardous.

NAPHTHALIC (or phthalic acid)—A crystalline acid obtained from naphthalene. Not inflammable.

NAPHTHA SOAP—A test made by the U. S. Bureau of Explosives showed that this soap contains about 5½ per cent naphtha. It should be stored in tight compartments because the vapor given off from a large quantity of soap might be sufficient to produce serious damage if it becomes ignited.

NAPHTHA WOOD—See Alcohol.

NAPHTHOL YELLOW is a color dye.

NAPPERS—Machines designed to brush or pick up the surface of knitted cloth, producing long nap or fleece effect. See Knitting Mills.

NARROW STREETS—Insurance on buildings on narrow streets should be written with caution. The fire department is often handicapped in fighting the fire for lack of room for their apparatus and cannot perform their best work.

NATIONAL FIRE PROTECTION ASSOCIATION—The purpose of the National Fire Protection Association is "to promote the science and improve the methods of fire *protection and* prevention; to obtain and circulate information on these subjects and to secure the co-operation of its

members in establishing proper safeguards against loss of life and property by fire." It is supported by members' subscriptions. There are two classes of members, active and associate.

NATRONA—A form of petroleum.

NAVAL STORES—Turpentine, pitch, rosin and tar. Usually stored in large area frame sheds or in yards along water fronts. Painting barrel heads is sometimes done on premises. Burn fiercely.

NAVE—The main body of a building having connecting wings or aisles on either side of it, as in a church.

NEATSFOOT OIL—Derived from the feet of various animals. Used for leather dressing. Rags saturated with this oil should be kept in self-closing waste cans.

NECKWEAR (especially ladies') is very susceptible to damage from smoke, fire and water. This stock might include the finest grade of chiffon and malines. See Silk Neckwear.

NEEDLES—Made from steel wire, cut into lengths, heated in furnace and rolled. Points are made on grindstone by hand. An automatic machine cuts out the gutters and flattens the heads. Eyes are punched in, and the needles tempered in a furnace. To polish, they are spread on a cloth, sprinkled with emery dust, oil and soft soap, and rolled in the cloth (called "friction" bath), rinsed in water, sorted and packed. Stock subject to severe water damage.

NELLIES—See Silk Plush.

NEPTUNE POWDER—Another name for dynamite.

NESTY—A term used by insurance men to describe congested areas of frame buildings.—(Gene Eagles.)

NET EARNINGS INSURANCE—See Profit Insurance.

NET SURPLUS of a company. After all liabilities have been met (including unearned premium reserve and paid up capital) that which remains is termed net surplus. It is an asset set aside mainly for the purpose of meeting obligations due to large conflagrations.

NETTLES of many fibres are now being used as fabric substitutes for cotton.

NEUTRALIZE—*If an acid is deprived of its acid prop-*

erties by means of an oxide (base) or vice versa it is said to be neutralized.

NEUTRAL SALTS, i. e., Glaubers, Epsoms, etc., are so called because the acid properties of the sulphuric acid are wholly neutralized in them.

NEUTRAL SPIRITS—An alcohol similar to grain alcohol. See Grain Alcohol.

NEWMAN SYSTEM of time recording for watchmen. The Newman System equips the watchman with a portable watch-clock which must be carried in rotation on every hourly inspection round to patrol stations located at the important inspection points. At each station there is a key, which when inserted and turned in the clock, registers on a paper dial therein the distinctive mark of that station and the exact time at which the station was visited. The keys are fastened and sealed at the various stations. The clock is locked while in possession of the watchman.

NEW VENTURES are usually tabooed by underwriters unless capital is in evidence to promote the business. If the applicant for insurance is starting his business career by opening a store or shop, the likelihood of his success should be demonstrated before a policy is written. Competition, suitability of store for the neighborhood, location and environment are pertinent features. If a manufacturer, the underwriter should be convinced that he can turn out his wares as well and as cheaply as his competitors, and that the wares are a good paying proposition.

NEWSPAPER PLANTS—Employ day and night shifts and some employees are about the plant at all times. The last class to want a fire because the success of a newspaper lies in keeping editions going. Printing hazards. Considered good moral fire risks. See Paper (in rolls).

NEW YORK BOARD OF FIRE UNDERWRITERS was established 1863.

NEW YORK FIRE INSURANCE EXCHANGE was established Mar. 8, 1899.

NICKEL PLATING—Solutions of nickel and ammonium sulphate or nickel ammonium sulphate are usually dissolved *in boiling* water. Good insurance risks. See Electro-Plating.

TINE—A volatile and inflammable liquid alkaloid.
TYLIA—An oily inflammable liquid.
R PASTE—Sometimes called **rubber substitute**, but a low grade rubber coming from the Niger country a. When taken from the trees, it is allowed to dry hen put in barrels and water added to keep it in a e. It boils at 120 deg. to 140 deg. F.; flashes at about F.
ERHEAD—A small black box enclosing the alarm sm on a water flow alarm attached to a sprinkler See Variable Pressure Alarm Valves.
IT WORK—According to the fire policy, if a manu-g plant is occupied in whole or in part between the f 10 p. m. and 5 a. m. the insurance is null and void, greement in writing is specially attached thereto.
ANILINE—Powder used by dyers to obtain blue; be ignited. A subjection to moisture causes it to ose, in which action it throws off heavy fumes and es heat.
ATES are salts formed of nitric acid with a base. orates.
te of **Ammonia**—Decomposes when heated, giving oxide and water. Not inflammable but readily sup-ombustion owing to the nitrous oxide which is given

te of **Barium**—See Barium Nitrate.
te of **Barytes**—Used for producing green fire. Vola-ot considered inflammable.
te of **Copper Crystals.**—If bruised or moistened will and may explode.
te of **Diazobenzene**—This compound is explosive.
te of **Ethyl**—The vapor detonates violently at about F.
te of **Iron**—Used for mordanting. Liable to spon-combustion.
te of **Lead**—See Lead Nitrate.
te of **Methyl**—Used by dyers. It is explosive.
te of **Potash**—Formed by the union of nitric acid

and potash (commonly called nitre or saltpetre) is one of the ingredients of gunpowder.

Nitrate of Soda—The storing of nitrate of soda, in sacks, is hazardous on account of the ease with which the enclosing sack can be ignited. Where nitrate of soda is stored in connection with carbonaceous matter, the hazard is increased owing to its liability to spontaneous combustion. Nitrate of soda is one of the most perfect deliquescent salts known, absorbing moisture from the atmosphere and yielding it up to other substances at varying temperature, must be regarded as an ever-present source of danger, and where moisture produces a fire hazard, the storage of nitrate of soda should not be permitted. The empty sacks should be immediately washed or burned.—W. P. Walsh.

Nitrate of Strontia—See Strontia or Strontium.

Nitrate of Tin—A crystalline explosive powder formed by the action of a fine spray of nitric acid on a surface of tin.

Ferric Nitrate is used by dyers.

Silver Nitrate—Used in photo-indelible inks and mirrors.

NITRATED CANE SUGAR—See Vigorite.

NITRATED COLORS—See Dyes.

NITRATED GUN COTTON—Gun cotton with nitrates added thereto.

NITRATIN—Is nitrate of soda.

NITRATING is usually a hazardous process.

NITRATING ACID—See Mixed Acid.

NITRE—As soon as emptied, nitre bags should be thoroughly washed and dried in the open. Empty bags are very inflammable. See Potassium Nitrate. See Nitrate of Potash.

NITRESINE—A mixture of resin and nitric acid.

NITRIC ACID—Composed of nitrogen and oxygen, obtained by the action of sulphuric acid upon nitrate of potash. See Acids, also the following article on the use of nitric acid.

Extracts From a Paper Before the Cincinnati Convention of the International Association of Fire Engineers by Chief Thomas A. Clancy, of Milwaukee.

If concentrated nitric acid be poured upon powdered charcoal it will take fire under ordinary temperatures.

aper, cotton, sugar, starch, and certain other organic stances treated with concentrated nitric acid, become oughly changed, and though in their outer form they ain the same, they become violently explosive.

/arm nitric acid run into badly annealed carboys will k them, and set fire to the straw or other packing, or ibustible material surrounding them. If this powerful lizing acid reaches pine wood, especially pine knots, a will result with frightful rapidity.

itric acid, while contained in the carboy, is safe enough, should it leak into organic matter, the mixture becomes ntaneously inflammable.

ike many other chemical substances it is readily affected light, and many substances formed by its action are de- iposed by exposure to sunlight.

'ses of Nitric Acid—Nitric acid is used in a very large iber of industrial operations, viz., in dyeing, in the prepa- on of lacquers; in the manufacture of picric acid, nitro- zol, etc.; in the manufacture of many coal-tar colors; many explosives, as gun cotton, fulminate of mercury, oglycerine, etc.

'he nitrates, as the compounds derived from nitric acid the replacement of its hydrogen by a metal are called, like the acid itself, powerful oxidizing agents. They refore require considerable care in handling, not because y have any tendency to burn in air, but because of their ility, when mixed with oxidizable matter, to produce its dation and consequent ignition and inflammation. Slight tion of a nitrate against any dry inflammable matter, such wood, may be sufficient to start a fire. If the nitrate and ammable substance be intimately mixed there results a lently explosive combination. Gunpowder is such a mix- e. Nitrates which are specially important on account of ir common occurrence are:

odium Nitrate—Largely used as a manure and in the paration of nitric acid, sometimes in the manufacture mining powder.

'otassium Nitrate, "Saltpetre" or "Nitre"—Used for pre-

serving certain articles of food; in the manufacture of matches and of gunpowder.

Lead Nitrate—Used in the preparation of pigments.

Ammonia Nitrate—Used in the preparation of nitrous oxide, the "gas" of the dentists, and in certain explosives.

The so-called **"Nitrate of Iron"** of the dyer, prepared by oxidizing "copperas" (ferrous sulphate) with nitric acid, consists mainly of ferric sulphate.

"Aqua Fortis" or **"strong water"** (because of its great solvent power) is the name given nitric acid by Gerber (A. D. 750-800), or one of his immediate predecessors, who made it by heating together saltpetre, copper, vitriol and alum. The first mention of the present process of making it is by Basil Valentine (A. D. 1450-1500) who says, however, that this method has long been used. Nitric acid was, therefore, one of the earliest mineral acids known.

Industrial Importance—Nitric acid occupies a peculiar position, somewhat like that of sulphuric, of great industrial importance as an intermediate step in the production of other products. Its salts are used to some extent in electroplating, since practically every one is soluble; in fireworks and colored lights, because of their high oxidizing power, and it is essential to the manufacture of many organic compounds besides nitrocelluloses, azo and diazo dyes. In tonnage and value, it stands among the leading chemical products. In the form of nitrates or substitution products it is essential in some way to the production of practically every explosive, while its salts (chiefly from natural deposits) are used for fertilizer in this country to a great extent.

Storage—Nitric acid should, if possible, be stored outside of manufacturing buildings or plants. If this cannot be done, then in vaults located in the basements of buildings. Some dealers in this article have separate compartments so that, in case of breakage, the contents may not run over the floor or mix with other acids and form explosive compounds of poisonous gases. Great care should be taken not to have more than what is actually required on any floor of the building and the acid not used should be re-

ted to the carboy and vaults at the end of each working . Due care should be taken not to jar the necks of carboys in opening them. A small, cheap saw will lily saw through the plaster of Paris around the stopper, wing it to come out easily. Heat of any kind will cause acid in the carboy to expand and, overflowing, will erate heat when it comes in contact with the straw cing of the carboy.

ITRIC ETHER, Inflammable—See Nitrate of Ethyl.

ITRIC PEROXIDE—It is very volatile, boiling at 71 F. The vapor of nitric peroxide is much heavier than ospheric air. It is a powerful oxidizing agent. Water rediately decomposes nitric peroxide into nitric oxide and ic acid.

ITRITE—A salt of nitrous acid.

ITROBENZENE—Benzene treated with fuming nitric and sulphuric acid, resulting in a heavy, yellow, oily stance. Also known as mirbane oil.

ITRO-BENZOL—Sometimes used as a substitute for er almonds in making confectionery. Cannot be stored listed storage store. Same as nitro-benzene.

ITROCELLULOSE—Formed by the nitration of cot- by treatment with a mixture of nitric and sulphuric s. Highly inflammable and explosive. See Cellu- .

ITROCELLULOSE FILMS—The storage, preparation manufacture is very hazardous and they should not be ed in large quantities where subject to one fire. See ion pictures.

ITRO CHLORINE—An oil like fluid and should be away from such combustibles as phosphorus, oil of entine, etc., as contact may render it explosive.

ITRO COLORS—See Dyes.

ITRO-COMPOUNDS—Are those having in their con- ition an oxide of nitrogen group which generally makes n of an explosive nature.

ITROGEN—A gas, which with argon, constitutes four- s by volume of the atmosphere, and constitutes the basis itric acid. Not inflammable.

NITROGEN BROMIDE—Formed by the action of potassium bromide upon nitrogen chloride. It has violent explosive properties.

NITROGEN DIOXIDE—A gas prepared by the action of nitric acid on copper. It hardly supports combustion.

NITROGEN IODIDE—This violently explosive substance is decomposed by light even when the heat rays are quite shut off. May be handled safely when wet.

NITROGEN MONOXIDE supports combustion.

NITROGEN PEROXIDE—Same as nitric peroxide.

NITROGEN TRICHLORIDE, an oily liquid. Extremely explosive nature. Decomposes with liberation of much heat.

NITROGLYCERINE—Obtained by nitrating glycerine with a mixture of nitric and sulphuric acids. A heavy oily liquid of yellowish color resembling glycerine in appearance. Highly explosive and dangerous. It freezes at about 40 deg. F. Very insensitive to shock when frozen and for this reason has been shipped packed in ice.

NITROGLYCERINE SPIRITS—A solution of nitroglycerine of not more than 10 per cent strength and grain alcohol; same inflammability as grain alcohol.

NITRO-HYDROCHLORIC ACID—Mixture of nitric and hydrochloric acids; gives off chlorine gas.

NITROLEUM—Another name for nitroglycerine.

NITROLIGNUM—See Pyroxylin.

NITROLITE—A high explosive containing nitroglycerine.

NITRO-MANNITE—A powerful explosive. If impure, said to be liable to spontaneous combustion.

NITRO-PHENOL—Is Picric Acid.

NITRO-SALICYLIC ACID—See Anilic Acid.

NITRO-STARCH—Formed by the action of nitric and sulphuric acid and starch.

NITROTOLUOL—There are various compounds shipped as nitrotoluol, for example, dinitrotoluol, mononitrotoluol and trinitrotoluol—some liquid and some solid. None of the liquids are explosive or dangerous. Of the solids, trinitrotoluol is the only one classed as a high explosive.

NITROUS ACID—May explode from atmospheric heat

NITROUS ETHER—Boils below summer temperature, ıerefore, unless kept in a cool place in well-stoppered botes, inflammable vapors are continually given off. Bottles f this oil kept in a moderately warm room may explode nd are liable to cause fire if any open flame is in the room. ame as Ethyl Nitrite; also Ether.

NITROUS OXIDE—Same as laughing gas.

NO. 99—Special cleaning fluid, classed as kerosene.

NON-BEARING WALL—One which supports no other ›ad than its own weight.

NON-CONDUCTORS—Substances that do not conduct r transmit heat or electricity.

NON-CONCURRENCY—In policy forms, this is a most nportant feature to be looked into by broker, insured, and ısurer. Many perplexing problems arise after a fire when djusting a loss on property covered by policies having ›rms which do not read alike. (H. Schley.)

NON-CONTRIBUTION CLAUSE—See Contribution Clause.

NON-DRYING OIL—Chief one is olive oil from olives.

NON-INFLAMMABLE—The term "non-inflammable" pplies to materials and substances which will ignite but vill not support flame when subjected to ordinary fire.

Alternative Definition—The term "non-inflammable" aplies to articles, goods, wares, merchandise or materials of onstruction which will support combustion, but will not eadily burn.

NON-STIPULATED WAREHOUSE—See Warehouses.

NOODLE MANUFACTURING—See macaroni.

NOON—According to the standard policy, this word ıeans noon of standard time at the place of loss or damage.

NORIT—A vegetable charcoal imported from Holland. Jsed in refining sugar for clarifying. Classed as powdered harcoal. Not permitted in stipulated stores.

NORTHERN LIGHTS—See Sawtooth Roofs.

NOT WANTED—Policies are frequently written, deivered to the assured, then returned to the company because he insurance is not wanted. Should not be marked off

after it has been in force for any length of time because an earned premium is then due.

NOTES—Cannot be insured under the standard policy form.

NOTICE OF LOSS—The first notice sent an insurance company when a loss occurs, stating that a fire has occurred, the date, and approximate amount.

NOTIONS—This stock generally suffers a bad damage from fire. The stock is composed of many different articles, some very susceptible to water, and others to smoke or the rusting of the metal parts which are generally on small wares. Celluloid articles may form part of this stock. Fair insurance risks.

NOVELTIES—Stocks of this kind are usually declined by underwriters. Celluloid, delicate and fragile articles, knick-knacks and all kinds of fancy articles are included in the stock.

NOVELTY JEWELRY MANUFACTURING—See Jewelry.

NUCOA BUTTER is pressed out of cocoanut shells and contains about 60 per cent oil.

NUCOLINE—Trade name for cocoanut oil.

NUISANCES—Glue factories, slaughter houses, soap factories, etc., in thickly populated sections are avoided by many underwriters. They may lower the value of surrounding property and may burn from incendiarism.

NUT AND BOLT FACTORIES—Hazards of annealing, tempering, machine shops with heavy and light machines, including threaders. Wood floors readily become oil-soaked. Soda-and-water cutting fluid if used in place of oil at the threaders reduces the oily floor hazard. The fire record is not good.

NUT GALLS—An excrescence formed on the leaves of certain trees by female insects. They contain tannic acid.

NUT OIL—Subject to spontaneous combustion.

NUTMEG OIL, if mixed with iodine, detonates and causes fire.

NUTS—Filberts, with solid shell, considered good insurance. Walnuts with parted shells not as good as filberts.

led nuts yield very little, if any, salvage, if wet, scorched even smoked. Considerable dust is made in cleaning. ap bags, shells, old paper and refuse are apt to be found eaps. Housekeeping is important in this class.

YLO HARDROIL—A compound consisting of 75 per mineral oil and 25 per cent emulsifying or animal oil. ıral flash of mineral oil about 400 deg. F. The comıd flashes at about 350 deg. F. Used for mellowing or ning leather.

O

OAKITE—A washing powder. No fire hazard.

OAKUM is fibre tarred with pine tar and mineral oil; should be kept in a standard vault. Process: Fibre is put through an oakum-carding machine and then run between corrugated rolls on which a solution of tar is kept dripping. This saturated fibre is then wound up and pressed into bales ready for shipment. The process is hazardous. The tar pot should preferably be outside of main building and heated by indirect heat or steam. Surrounding woodwork burns quickly when saturated with the drips of scattered tar solution. Serious exposure to surrounding properties. A K. O. class with most companies.

OAT CRUSHERS—Used in stables for crushing oats. Should have a magnet attached to keep metallic substances from passing through the rollers and creating sparks which might ignite the dust. If oats are screened before crushing the hazard is lessened. The fire record shows a number of fires in oat crushers without magnet attachment.

OAT MEAL—Heats very quickly owing to its large infusion of vegetable oil. In large quantities, it may ignite spontaneously.

OATS—Fires have probably been caused by spontaneous combustion due to the fermentation of the grain stored in damp places.

O. C.—The abbreviation for "on centers," meaning the distance from center to center of timbers, as beams "spaced 16 inches O. C."

"OCCUPANCY"—Means the use to which a building is put or the purpose for which it is occupied. The contents *of a building* determine its "occupancy." The "occupancy"

be a carpenter or paint shop, a garage, school house, :re or grocery store. One building may have several pancies, as stores on the first floor, offices on the second, lodging rooms above. "Occupancy" in fire insurance lules means the classification of the business of the ıts of any building. (Washington Surveying and Rat- Bureau.) See Loft, also Risk.

CEDAR MOPS—(a trade name)—The liquid used con- mineral oils and a substitute turpentine called "Sonoca." manufacturers claim it is not subject to spontaneous ›ustion, although many fires are attributed to the burn- of mops. They should be kept in ventilated metal ›ets. See Mops.

:HRES—Clays tinted with oxide of iron and manganese a small per cent of water and sulphur. They are cially dried to expel water. They are ground in raw ed oil. Yellow colored ochre is due to the presence cide of iron; brown, to manganese oxide.

'FICE BUILDINGS (fireproof)—The main features he height, protection of ironwork, and floor openings. r losses have occurred to old records and files kept ood cabinets, or lockers in rooms where boys go to ;e and smoke. Recommend all-metal construction for rs. If restaurant or club in building, inspect carefully ›etting of range. Excellent insurance risks.

IM—The unit of electrical resistance.

L (Seed Oils) are oils extracted from seeds such as ›d oil, poppy oil, etc. Such oils may ignite spon- ›usly when decomposition sets up (sometimes called dity) due principally to keeping the oils at too a temperature. Mixing mineral oil with seed oil roperly blended) tends to preserve the oil and also ly eliminates the spontaneous combustion hazard. If eed oil is of a higher gravity, and settles to the bottom ıe barrel, and leaks out and saturates cotton waste, :aneous combustion may result. Mineral oils are not ct to spontaneous combustion. All oil fires are very to extinguish,—water will not mix with it, and the

oxygen from the water sometimes tends to intensify the fire. Risks of this type are a serious exposure to surrounding buildings. See Oil Tank Fires and Protection Against.

OIL AND GREASE fires are best fought with ashes, earth, sand or cloths providing they are in well-ventilated places. If in closed places the introduction of steam will be found most desirable. One bushel of sawdust mixed with 10 lbs. of carbonate of soda is very efficient. It floats on the top of the burning substance and smothers the fire. Liberal quantities should be used. Sand is also good but it does nof float and is apt to cake. See Grease Fires.

OIL, BOILING POINTS—Illuminating 212 deg. F. to 450 deg. F. Lubricating, 450 deg. F. to 800 deg. F. Paraffine oil, 600 deg. F. to 800 deg. F. Naphtha, 90 deg. F. to 212 deg. F. Mixture of lubricating and paraffine oils, 450 deg. F. to 800 deg. F. The lower the boiling or flash point the greater the danger of combustion or explosion.

OIL BURNING EQUIPMENTS (except household)—Except in isolated sections, the supply tank should be three feet under ground or three feet below basement floor of building and lower than any of the piping. This allows the oil to return by gravity to the tank. The capacity of tanks is regulated by local underwriters. Tanks (iron) to have a firm foundation, the soil around same well tamped (pounded down), the covering to be dirt with 6-inch concrete topping, tanks coated with rust-resisting paint. If tanks are located above ground, the oil must be pumped to the building or place where it is to be used and not run by gravity to supply pipes, otherwise, in event of fire, a broken pipe would allow all the oil to drain from the tank and be a source of danger to surroundings. Dikes are built around tanks to prevent the oil running away where gravity feed is used. One-inch vent pipes are required on all tanks to extend 12 inches above any tank car or reservoir. Those connected to tanks located inside of buildings should extend outside of building, three feet from any building and one foot above the roof, with screened gooseneck. See Cooking *and Heating* Apparatus. See Fuel Oil.

OILCLOTH FACTORY FIRE—Chandler Oilcloth Co., Yardville, N. J., May 2, 1916. The cause probably being gasoline vapor in the drying cells and coating room. The recommendations follow: (1) Where drying is accomplished by direct radiation in the drying cells, a system of ventilation by means of air exhaust fan in a separate building, taking suction from the bottom of each cell and discharging to the atmosphere should be employed; (2) Drying cells should be of heavy brick side walls with parapets, but of light fire-resistive roof; fire doors should be at openings; (3) Coating machines should be provided with steam jets and floor should be sprinkled to keep humid condition of air; (4) Coating machine knife rolls, etc., should be grounded together with shafting and machines; (5) Electric light wiring in coating room should be standard in conduit with vapor-proof globes with wire guards; (6) Automatic sprinklers; (7) Quantity of coating mixture and gasoline should be reduced to minimum. —(A. R. Ramsdell, N. F. P. A., Vol. 10, 1916.)

OIL CLOTHING—Clothing which has been waterproofed with linseed oil. When packed in solid piles it is subject to spontaneous combustion. Should be hung on racks so that air will circulate through the stock. Poor fire record class even in fireproof sprinklered risks.

OIL-COOKING AND HEATING—See Cooking and Heating Apparatus.

OIL DOCKS—Fires on these docks are generally very severe owing to the woodwork absorbing the dripping oil. Fire record poor.

OILED CLOTHING FACTORIES—The principal hazard is the coating process. The first coating is given by dipping in linseed oil. The garments are then hung in dry rooms and allowed to air dry and the oil to oxidize, during which a heavy and pungent gas is given off which is carried out by means of ventilators. After several hours the heat is turned on and jackets thoroughly dried out, after which they are given several coats by means of brushes. These latter garments have less linseed oil and little gas is given off in drying. There is no danger from the gas given off, but fires sometimes occur from spontaneous combustion due to the

heat generated when garments are piled too closely, or have fallen on the floor, thus preventing complete ventilation. A poor fire record class.

OIL FIELDS—Deep-well drilling particularly is very hazardous because the boiler generally used has an open fire box and is liable to start a grass fire. The forge is usually kept within the derrick, and is safe in small volume wells or when the wind is blowing in the opposite direction. When a large gas pocket is struck, however, and the forge fire is not quickly extinguished, enormous fires usually result.

OIL GAS—Produced from paraffine oil. It is heavier than coal gas and heavier than air, rolls along the ground like a cloud and can be readily observed. It has been known to travel 300 to 400 feet to an open fire, flash back and explode the gasometer. When ignited in this manner, the flame is immense and lasts longer than the same volume of coal gas. See Pintsch Gas.

OIL IN CANS—If cans are soldered, a moderate degree of heat may melt the solder, allowing the oil to escape, and thus feed the fire.

OIL LANTERNS—See Electric Lanterns.

OIL OF GERANIUM—See Grass Oil.

OIL OF LEMON GRASS—See Grass Oil.

OIL OF MACE—When treated with iodine detonates and causes fire.

OIL OF MIRBANE—See Mirbane Oil.

OIL OF SPIKENARD—See Grass Oil.

OILPROOF—See Shoe Factories.

OIL REFINERIES—Lightning is the greatest danger to tanks. Direct heat is used, and leaky valves or defective equipment may allow inflammable vapors to escape. After condensing, oil is graded by re-distilling. Gasoline and kerosene are purified with acid in large tanks agitated by steam or air under pressure. See Oil Tank Fires and Protection Against.

OIL SEPARATORS—Those installed in a garage should be connected to the house drain, and be so arranged as to separate all oils from the drainage of the garage. Separators should be enclosed in partitions of incombusti-

: material. Vapors are apt to accumulate around the ɔarator if there be any leakage, and an open light may ıse an explosion, especially if a candle or match is used to d the leak. If the separator is properly cut off, a fire will prevented from gaining access to the balance of the build- ;. (W. H. Holl.) See Garages.

ƆIL STORAGE RISKS may include storage of gasoline, d filling of cars. Fires have been caused by back-firing automobiles in driveways of buildings. Automobiles ɔuld be kept outside of buildings and barrels or cans .ded outside. Tanks of small capacity may have a com- ıed fill and vent pipe so arranged that fill pipe cannot be :d without opening vent, if oil is conveyed to underground ırage tank by means of a fill pipe with inlet on street or rd. The inlet opening should be capped and surrounded an iron box with cover and kept locked to prevent tam- ring.

ƆIL STOVES when on fire should have ashes or wet ıths placed around them, and, if possible, under the same ithout moving the stove) and the fire then smothered with t cloths. It is unwise to move the stove as the oil is ely to spill and spread the fire or explode.

ƆIL TANK FIRES AND PROTECTION AGAINST— ıe process consists in mixing two chemical solutions to ɔduce a thick tenacious foam containing bubbles of car- n-dioxide, and in spreading this foam over the surface of : burning oil. There are two methods of application of : foam: First, pumping the two chemical solutions from :entral point through twin pipes to a point as near as pos- ıle to the oil tank, bringing them together in a mixing amber and allowing the foam to spread over the burning ; second, automatic distribution from foam generators on :h tank.

.n the first system, as mentioned above, the two aqueous utions used to produce the foam are aluminum sulphate d sodium bicarbonate in which is dissolved a small amount secondary extract of licorice root. The two solutions are ıred in either open or closed tanks near the pump. Owing the corrosive effects of the aluminum sulphate solutions

on iron, the tank for storing this is lined either with lead or some acid resisting material and a brass pipe used between the tank and the suction pump. The pump cylinders pumping aluminum sulphate are made either of bronze or bronze fitted, and acid resisting metal should be used in the valves. Standard wrought iron or steel pipe is used for the remainder of the equipment. The solution tanks may be equipped with perforated compressed air lines running down into each tank close to the bottom so that the solutions may be agitated by air. This agitation can be accomplished by circulating the solution through the pump and back into the tank at the top. The tanks are usually placed in a building or below ground to prevent freezing of the solutions. The pump used is designed to deliver equal quantities of each solution to the lines leading to the oil tanks. The manufacturer of this system claims, "that under favorable conditions, with the oil surface free from obstructions, one-fourth gallon of each of the solutions per square foot of oil surface is sufficient to extinguish any oil fire and one-half of this amount will often do the work. In actual fires such conditions rarely exist, and occasionally ten times the above quantity is required to put out burning tanks owing to fallen roofs, timber supports and other obstacles to the free flow of the foam."

From the pump the solutions pass through separate lines into mixing chambers attached to the oil tank. On the oil storage tanks two mixing chambers are attached 180 degrees apart so that the foam may be applied from two points to the surface of the contents.

The second method of application of the foam: the automatic distribution from foam generators on each tank is carried out by an entirely different equipment: The system is set in operation by the fusing of a link above the surface of the oil in the tank. The foam is produced by the action of sulphuric acid on an aqueous solution of sodium bicarbonate in which soap bark is dissolved. Two types of this extinguisher have been installed, one called the **stand-pipe** method and the other the **underground method.** The *underground type of* installation is used on tanks located in cold

mates or where the temperature might become low enough cause the sodium bicarbonate solution to freeze. In e installation of the above ground type, the stand-pipe mounted, alongside of the oil tank, on a concrete base d contains a solution of sodium bicarbonate and soap rk in water. Above the level of the soda solution is ounted an acid container in which sulphuric acid is stored. low the acid reservoir and extending down into the soda lution is a perforated pipe through which the acid, when leased, goes into the soda and soap bark solution and genates foam, which passes through the outlet at the top of e standpipe and into the tank. The release of the acid accomplished by one or more fusible links melting and owing the hammer at the top of the acid tank to fall on plunger and break the glass plate in the acid box at the p of the acid discharge pipe. The fusible links are so ranged in the tank that there is always one near the surce of the oil. Other links are located in chains placed orizontally across the tank just under the roof and running er sheaves down into the tank.

Underground Method of Installation—The tank containg the solution of sodium bicarbonate and soap bark is aced below the ground level and the top of the sulphuric id container is just above ground. The foam is conducted om the generator to the top of the oil tank by means of vertical discharge tube. This type of generator is equipped ith fusible links arranged in a manner similar to those sed in connection with the stand-pipe type of generator. The sible links used are designed to fuse at about 212 deg. F. hese devices have proved very satisfactory in the extinuishing of oil tank fires. Lightning rods have at times en applied to storage tanks without marked benefit. In ct, it has at times seemed that tanks so equipped were e most likely to be destroyed.

OIL TESTING—In testing an oil for its flashing temperure the most rational method would be to heat the oil to given temperature, aspirate it well with air and apply a me to the mixture, noticing if ignition occurs.

OIL OF TURPENTINE—Boils at 310 deg. F. See Turpentine.

OIL OF VITRIOL—Boils at 310 deg. F. See Sulphuric Acid.

OIL VARNISH—The resin is melted in a copper pot and the product dissolved in hot linseed oil. The solution is then poured into turpentine.

OIL WAREHOUSES—Lubricating oil burns with a dense black smoke. Water in tremendous quantities is necessary to extinguish a fire once started in an ordinary-sized building. Barrels burst open, oil and water soak through walls and damage stocks in adjoining buildings.—G. W. Lapp.

OILY FLOORS under all kinds of machinery should be cleaned with a solution of ammonia, potash and lye. Under all heavy machinery such as pipe cutters, printing presses, motors and gas engines, a metal base with curbed edges should be placed to catch the oil and prevent it from spreading and soaking the floor. Sand should be used in place of sawdust for catching drips.

OILY RAGS—See illustration, page 614. See Silk Wiping Cloths.

OILY WASTE RECLAIMING—Use steam-heated centrifugal machines, similar to laundry extractors, for extracting the oil. Fires have occurred in heaps of oily waste awaiting reclaiming.

OINTMENTS—Ingredients include lanium, paraffine, petrolatum, cocoa butter and wax. Hazards of heating by direct heat, and oily floors.

OLD METALS—See Refiners.

OLD RECORDS and Files—See Office Buildings.

OLD RUBBER and Metals—See Junk Shops.

OLEIC OIL—See Red Oil.

OLEINE—A fusible oil extracted from fat.

OLEOMARGARINE—Made of beef suet and cottonseed oil.

OLEO-STEARINE—A packing-house product derived from beef fats used in the manufacture of compound lards.

***OLEUM* or *N.* O. V. (Nordhousen Oil of Vitriol)**—The

ercial term of fuming sulphuric acid containing anhy-

[BANUM—A fragrant gum resin, readily ignited.

[VE OIL—Used in cooking food, soap-making, etc. ıe premises of bottlers sawdust is used to catch the from barrels. Fires from spontaneous combustion ɔeen thus caused. Premises usually very greasy. Fierce rs if once ignited.

re Oil (Sulphured) is obtained by the extraction of oil by means of bisulphide of carbon.

[VOLINE—A non-gumming oil used for lubricating.

NIBUS BAR, usually called 'Bus-bar—The bar in a ıboard or similar apparatus which receives the current the main circuit and distributes the current among the h lines or leads.

[NIBUS RISKS—Those housing a number of tenants different manufacturing hazards. Lines are usually down on this class of buildings.

E-FIRE RISK—A risk, either a single building or of buildings mutually exposing each other and sub- o destruction by a single fire. One of the most im- nt features to understand in underwriting.

YX (Imitation)—See Imitation Marble.

AL OIL—A petroleum distillate treated with sulphuric ınd rape oil.

EN—When said of stairs, elevators, well holes, etc., s unenclosed or not trapped. Fire usually finds its way ıese open shafts.

EN FINISH—The absence of any finish so that the ing or ceiling joists are exposed.

EN GRILLE DOORS—See Iron Grille.

EN POLICY ACCOUNTS are opened for the conven- of brokers or assureds for the purpose of simplifying rriting of various sums of insurance mainly in storage ıouses, covering at various locations for short terms. licy number is assigned to the account and all entries ıade in an "open policy book" instead of on a policy. ıe end of each month the company renders a bill for *nount of premium* due for insurance carried during the

month. Before the insurance company decides to open one of these accounts, the broker has to furnish a list of the warehouses where the assured's business is expected to cover and the total amount of insurance which may be placed in any one of the buildings mentioned. (Good insurance.)

OPEN SPRINKLERS—Open sprinklers on outside of buildings are controlled by a valve, operated by hand. The system is dry pipe, and heads are already open, therefore no fusing is necessary. Used also to protect property from exposure fires. Used at the sides of piers for protection against burning vessels. On three-story buildings one line over the top row of windows would be enough if the exposure is not too severe. On higher buildings there should be a line over the two upper rows, and in some cases a line over the third or further upper rows. It is best, however, to have them over each and every window. See Sprinklers.

OPEN STOCK—That which is not wrapped or packed or which is partly open for display. Not as desirable as cased stock or stock in original containers.

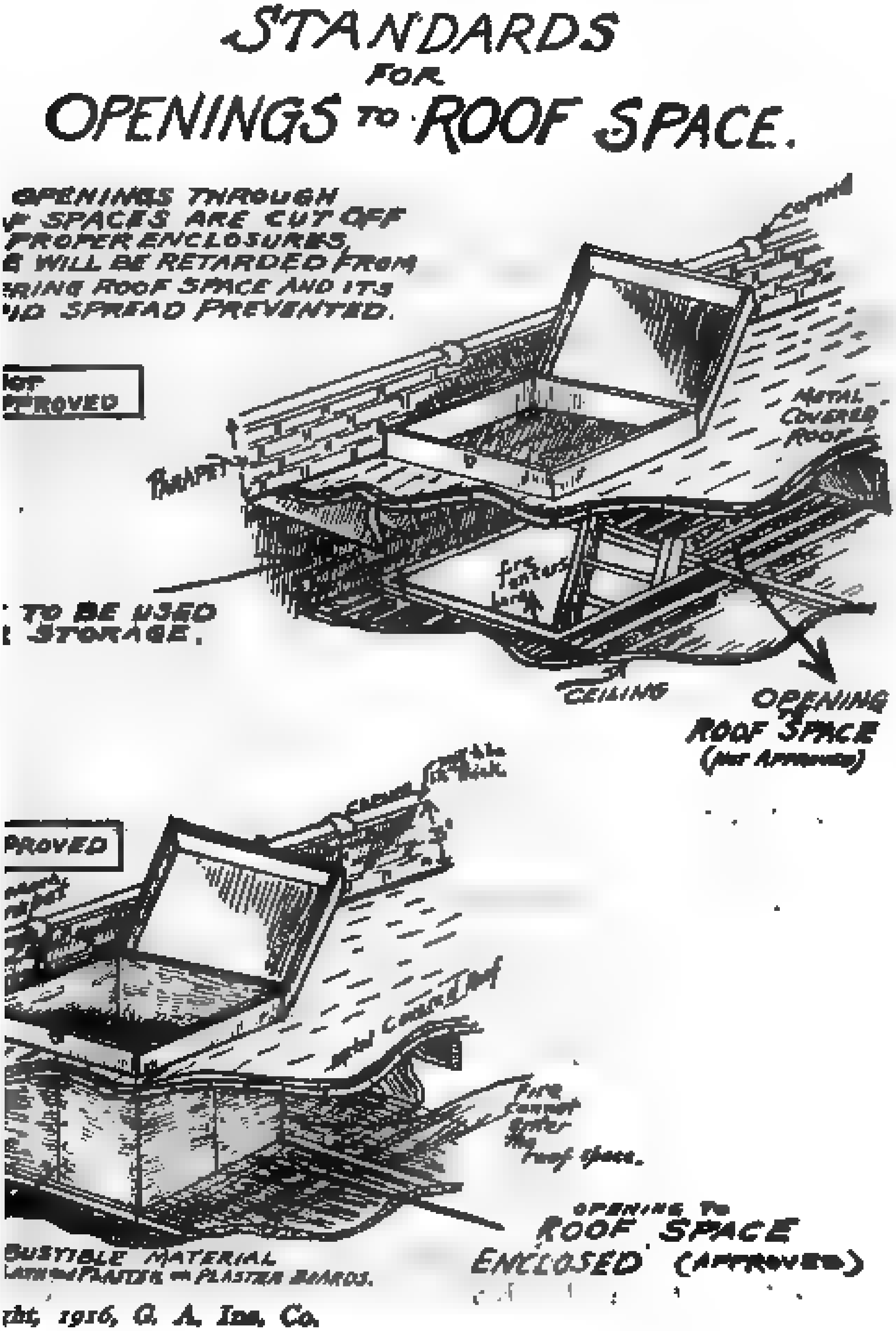
OPENINGS TO ROOF SPACE should be boxed to prevent fire entering the same. See illustration on page 477.

OPERA HOUSES—See Theatres.

OPIUM—This stock is usually kept in metal-lined cases in the basement on account of the temperature at this point and also to keep it away from other commodities. It is very valuable. Fire and heat would be likely to cause serious damage to this stock. Water washes out the morphine alkaloid and renders it valueless. Opium is a milky exudation from the unripe capsules of the poppy plant and this milky substance is rendered concrete by exposure to the air. As found in commerce it is a reddish brown, sticky, gum-like body with a bitter taste and a heavy odor. It is used as a medicine and smoked as an intoxicant. Crude opium is usually handled in small lumps (gum-like) about 2 to 3 inches in diameter and are frequently wrapped in tropical leaves and packed in well-constructed metal-lined cases.

OPTICIANS—Principle hazard is lens grinding. A deposit of pitch is put on one side of the lens before grinding. Pitch is usually heated by direct gas heat.

ns Grinding—There are three types, the edge grind-
resembling ordinary grindstones, the optic grinders
h are conical shaped and revolving, and the cylinder
lers which are oscillating. The first grinding is by
h emery, followed by fine emery, then by rouge which



imparts a smooth surface and polish to the lens. Good insurance risks.

ORDINANCE. The fire policy will not protect an assured, should any ordinance or law tend to increase the cost of repairs or reconstruction. See Contingent Liability.

ORDINARY—Designates a brick building constructed in the ordinary manner with joist floors and roofs. Derives the expression from the fact that about ninety-five per cent of brick buildings are of this type. Briefly speaking, the walls are brick; floors and roof, single one-inch boards on wood beams. Any brick building inferior to semi-mill or mill construction can properly be termed "ordinary."

ORGANIC COMPOUNDS—Generally considered as substances of vegetable or animal origin.

ORGANIC SUBSTANCES or combination of substances which have an affinity for oxygen and which are poor conductors of heat will, when slightly moist, ignite spontaneously, and the more tightly any oil soaked fibre is packed and compressed, the better it is able to retain heat and the more rapidly it will ignite spontaneously.

ORGANS—Most companies refuse to write church organs unless receiving a line on the building or other furniture of the church. No gas light or lamps should be allowed inside of organ, and no gas jet to swing against organ frame. Very susceptible to fire and water damage.

ORIASITE—See Meganite.

ORIGINAL—Trade name of a dust-cloth treated with mineral oil. Approved.

ORNAMENTAL STONE FRONTS—Are easily damaged by fire and heat at a considerable distance. Inspectors should always note if finish is plain or highly carved.

ORSEILLINE—Coal tar colors of the azo class.

OSAGE ORANGE—A tree extensively cultivated for hedges. Used by dyers and tanners, the dye therefrom being chiefly used to color khaki uniform cloth.

OSMACO REDUCER—Flash point 100 deg. F. Classed as non-volatile.

OSTEOCOLLA—Glue made from bones.

***OSTRICH* FEATHERS**—If raw, will stand a little water

e, and still give good salvage. A moderate amount will not entirely ruin raw ostrich feathers, as they yed. Water in large quantity has a serious effect ock. If water settles around the stem of the feather obably rot, and when shaken the flues will fall out. nufacturers claim that fancy feathers, such as bleached goose, bird, etc., even if raw, will lose nt of value if drenched with water. Manufactured are nearly total loss when wet. **Finished feathers** susceptible, owing to dyes used and the prepared

R INSURANCE PERMITTED—The body of the ites that the company must be notified if other ins taken to cover the property insured. The clause ed to frustrate over-insurance as an inducement to ism. It is now a general practice to include "other permitted" on forms without ascertaining the real the property. See Forms.

UILDINGS—These innocent-looking structures to contain almost anything from rags to dynamite.

)F REPAIR—Buildings that are not kept in good are considered poor insurance risks.

UT—A business term meaning the product of a facspective of the sales.

ALLS—See Contractors.

INSURANCE—One of the most important feabe determined by the underwriter before passing a his is one of the prolific causes of moral hazard good inspector will always size up the premises to if amount of insurance carried is warranted.

LOADING OF FLOORS—Liable to cause sagging w shafting out of alignment, resulting in friction heated journals. Buildings with this feature should d.

TIME—Factories which continually work their men have been known to have numerous fires, owing to r indifference of the tired workmen. According to of the printed policy, it is necessary to have a perrk later than 10 p. m. (H. Small.)

OWNERSHIP—According to the New York Standard policy, unless provided by agreement in writing, the entire policy shall be void if: (1) The interest of the insured be other than unconditional and sole ownership; (2) if the subject of insurance be a building on ground not owned by the insured in fee simple; (3) if with the knowledge of the insured, foreclosure proceedings be commenced or notice given of sale of any property insured hereunder by reason of any mortgage or trust deed; (4) if any change, other than by the death of the insured, take place in the interest, title or possession of the subject of insurance, except change of occupants without increase of hazard; (5) if the policy be assigned before a loss.

OXALIC ACID—Prepared by heating sawdust with caustic soda and caustic potash. Used in calico printing, dyeing, bleaching, cleaning brass. Poisonous, corrosive. Non-hazardous.

OXIDE OF AMYL—See Potato Ether.

OXIDE OF IRON is iron rust.

OXIDE OF TIN—There are two oxides. Stannous oxide is a black powder which burns in air giving stannic oxide. It readily oxidizes in air giving off considerable heat. The stannic oxide is not effected by heat at ordinary temperatures and is not hazardous.

OXIDES are so called because they contain oxygen.

OXIDIZING—Combining a compound or an element with oxygen. It may be rapid or very slow, with or without a flame. Oxidizing substances should be separated from carbonaceous materials. See Spontaneous Combustion.

OXIDIZING AGENTS—See Permanganate of Silver, also Permanganic Acid.

OXY-ACETYLENE WELDING—A combination of oxygen and acetylene is used for cutting or welding, producing a temperature as high as 6,000 deg. F. Used in most large machine shops and garage repair shops. The acetylene is seldom generated on the premises, but is received in tubes or tanks (cylinders) in the same manner as compressed oxygen. The apparatus is portable. The cylinders are provided with a fusible plug melting at 240 deg. F., to prevent explo-

sions and in case of fire to allow the gas to escape slowly. The oxygen and acetylene cylinders each have a pipe attached, leading to a nozzle where the flame is used, and each cylinder has a pressure-regulating device indicating the working pressure being used and the pressure in the tank. Special storage places necessary. Cylinders not to be subjected to unnecessary heat, such as near a stove. Exercise care in handling, for if break occurs, the acetylene gas under pressure (about 1,800 lbs.) is released and by proper mixture with air is explosive. These outfits are dangerous when used by careless workmen. See Autogenous Welding.

OXYGEN—A colorless, odorless, non-inflammable gas. It is needed to support combustion. If excluded from the air surrounding a fire, the blaze would immediately be extinguished. Fifteen per cent of oxygen is needed to support fire.

OXYGEN CLEANING PROCESS for cylinders of automobile engines. From report of Underwriters' Association of New York.

The apparatus consists of an ordinary commercial metal oxygen cylinder containing the gas at an original pressure of about 300 lbs. The outlet is piped to a reducing valve set at from 15 to 25 lbs. and at this pressure the gas flows into some 5 to 8 feet of rubber tubing terminating in a combination handle and controlling throttle by which the oxygen is fed through a small metal tube some 10 to 14 inches long, forming a nozzle. In some cases it would appear that the reducing valve is omitted and the pressure reduced by expansion only.

The practice seems to be to remove spark plugs from the automobile cylinders, and bring each piston successively to the top of its stroke as its own cylinder head is being treated, thus closing both ports of the cylinder. A burning match or taper or a small piece of kerosene-dipped waste or piece of paper is then dropped into the spark plug opening and the oxygen jet introduced. The combustion thereon becomes much more active, consumes the original kindling rapidly and continues at high temperature until all carbon deposits are also burned away. When the last of the carbon is con-

sumed the flame ceases. The only outlet during this process is the spark plug opening, through which the oxygen is introduced and bits of incandescent carbon, varying in size according to the conditions, some as large as a medium-sized pea, are blown out with considerable velocity. Some precautions in the shape of asbestos sheets are usually taken to prevent these sparks from falling inside the engine hood or elsewhere where they might do harm. It seems to be the practice to keep an extinguisher or two at hand while the work is being done.

OXYGEN GAS CYLINDERS—The approved type have a safety outlet sealed with a fusible metal, which melting, allows the slow escape of the gas. Storage should be outside of building, if possible.

OXYOZON—Metal polish. Flash, 208 deg. F. Classed non-volatile.

OZOKERITE—A natural mineral wax. Melts at 140 deg. F.

OZONE—A colorless gas with a pungent odor like chlorine.

P

PACKING—The material placed in the stuffing box of shafting to prevent leaks. Also used for pipe-covering. Materials used in boxing merchandise.

PACKING BINS—All inflammable substances used in packing, such as straw, tow, moss, tissue paper, excelsior, should be kept in a standard packing bin. Wood boxes must be lined with lock-jointed sheets of tin, hiding the nails so they cannot come out, and prevent the oxygen reaching the wood. The cover of box to be of same material, arranged with fusible link to close automatically.

PACKING CASES—Yards where boxes are made or remade usually locate in congested sections. They may be in high piles under windows of adjacent buildings and contain considerable rubbish. Sometimes classed as conflagration breeders.

Packing Cases (New)—Firms making them usually locate in old buildings. Ordinary woodworking hazards. If undressed lumber is used, planers are necessary. Soft woods are used exclusively. Not considered desirable insurance risks.

PACKING HOUSES—Where cattle, sheep and hogs are slaughtered and dressed for market. The slaughtering and dressing present no special fire hazards, but in large plants the wooden pens are extensive and are fire breeders. The incidental hazards are very important, such as cooper, repair, carpenter, blacksmith, electrical and paint shops, power houses, refrigerating machinery, stables, manure and garages. Fair insurance if hazards are safeguarded. See Slaughtering Houses.

PAILS AND CASKS—Are liable to freeze in buildings without heat. Non-freezing solutions should be put in con-

tainers at the approach of winter. Calcium chloride can be used to good advantage. See Fire Pails; also page 699.

PAINT FACTORIES—The process is practically a series of mixing and grinding with slow or moderately rapid ma-

chinery according to the particular paint being made. The first mixing stirs the oils and pigments together in a "pug-mill," an open or closed cylindrical tank equipped with paddles which rotate rather slowly. For finer grinding, the

buhr stone mill or an all iron mill is used. These are usually water cooled, i. e., there is a water jacket at both the upper and lower stones through which the water circulates, thus keeping down the temperature and preventing the stones from becoming unduly hot. The same principle applies to all-iron mills.

Dry grinding of colors is seldom done, and as all pigments are ground in either oils or japans, the flash fire hazard incident to dry grinding is not present.

The common hazards of light, heat and power are important. No open lights or fires are permitted, all electric wiring should be of the highest standard, boiler room should be properly cut-off or detached and all steam pipes located where oily rags cannot lodge behind them. Where volatile, inflammable solvents are used such as benzine or substitute turpentine, the vapors from them are dangerous. Cans for paint should be of the pressed-top type rather than soldered, as this eliminates the hazard of gas soldering mufflers and soldering irons. Storage of raw materials, oils, pigments and solvents should be in a separate section of plant. Oily waste cans are very necessary especially where linseed oil is used. Floors should be scraped frequently to remove paint drippings. Sand is better than water as an extinguishing agent, except of course when water is supplied from a sprinkler equipment. Extinguishers of the foam type should be provided for oil storage tanks. Quick burner. Generally poor fire risks. (Henry Siemer.)

PAINT REMOVERS may contain alcohol, wood alcohol, benzole, gelatine or naphtha. The flash points are usually low, but the wax content prevents evaporation to a certain extent and the fire hazard is reduced thereby.

PAINTERS AND DECORATORS—Busiest season, April to October. Stock consists of the usual paints, wall paper samples, scaffolds, ladders and may include inflammables, such as benzine and turpentines. Smoking on premises should be prohibited. Fires have resulted from spontaneous combustion of oily rags and overalls. In buildings where painters have been at work, care should be exercised to see that all refuse and waste material is removed at night before

locking up. Gasoline torches for burning off paint have caused many fires, due mainly to the workman leaving the device unattended. Poor fire record.

PAINTING—Wherever this work is done care should be exercised to see that no open flames are present. Work should be done in a cut-off section. A charge is usually made for this feature in rate schedules.

PAINTINGS—In writing insurance on paintings care should be used as to the wording of the policy form, and the moral hazard investigated. There are three general forms. First, one of agreed limit of value; second, "it is understood and agreed that this is its true value." Under this form, company must pay total loss in case of fire. Third, with abandonment feature, the company is required to accept surrender of paintings in case of loss. Co-insurance is quite necessary in writing paintings, to protect the interest of the company. (A. Williams.)

PAINTS—Composed of pigment and liquid. Pigments are inert substances, such as asphalt, clay, coal, barytes, coke, coal-tar, charcoal, chalk, feldspar, carbon, flint, granite, graphite, gypsumite, lamp-black, lime, magnesia, manganese, ochre, iron, pitch, quartz, resin, sand, silica, zincs and oxides.

Oils and Solvents—Bisulphide of carbon, carbon tetrachloride, benzine, cotton-seed oil, cod oil, poppy oil, resin oil, petroleum, turpentine, ammonia, linseed oil, alcohol, acetic acid, sulphuric acid, muriatic acid, glycerine, carbonic acid. The degree of inflammability depends wholly on the nature of the liquid ingredients. The quantity on hand for use should be kept to a minimum.

Acid-proof Paints may contain coal tar, pitch, minerals, cement, ochre, asbestos, slaked lime, dryers, litharge, saltpetre, sulphur, mica, zinc, acetone.

Fire and Waterproof Paints may contain coal tar oil, gypsum, japan, liquid rubber, nitric acid, silicate, slate dust, salsoda, potash, antimony, sodium, ochres, sulphur, caustic potash, mica, sulphate of zinc, acetone, soap, saltpetre.

PALEINE—An explosive similar to straw dynamite.

PALLADIUM is considered a very rare metal. It is

d in the manufacture of crucibles, and as alloys such as gold-palladium of the dentist.

'ALLETS—See Tile Works.

'ALMETTO—A tough, hard fibre, native of Algeria and rocco. Sometimes used as a substitute for horse hair, ed "vegetable horsehair."

'ALM OIL—A semi-solid fat extracted from the fruit of eral species of palm. Used in soap making.

'ALM ROOT—Botanically known as Piassora. A strong etable fibre obtained from a specie of palm leaf. Im-ted from Brazil and used largely for making brooms. rns readily.

'AN HOUSE—See Sugar Refineries.

'ANAMA STRAW HATS are not damaged by clean ter and only need to be reblocked even though being in ter for a considerable length of time. The best Panama s are woven by hand under water. Cleaners invariably sulphur for cleaning and bleaching. In large establish-nts numerous gas-heated blocking irons are used, also a or steam-heated dry room. Only fair insurance risks.

'ANEL RAISERS—Wood-working machines similar to iters. Make considerable refuse. Bad features are over-ted bearings and ignition of greasy sawdust.

'ANEL WALL—An exterior non-bearing wall in a skele- structure, built between piers or columns and supported each story.

'APER (in rolls)—Stock mainly used by newspapers nes in large rolls and may be stacked on ends. Some time , a fire occurred in the sub-basement of the Scott & wne Building, New York City. This entire floor was used storage of rolled paper stock. The Fire Department used h pressure streams, with the usual flooding effect. The led paper was not skidded and stood in about five inches water. When the paper absorbed the water, each roll st from expansion, the report resembling a pistol shot. h stocks should be on six-inch skids and the floors should scuppered. No stock to be stored below grade floor. iile fire will burn the edges, these can be trimmed and

considerable salvage obtained. Flat and bundled stocks are in the same class as rolled stock.

PAPER BOXES are made principally from cardboard which is cut to size, grooved (scored) where the sides and ends are to be folded, and the edges fastened together by strips of paper. This latter process is called "stripping." At times cold paste may be used or the corners wired together. The method of glue heating is important. The premises are usually crowded and untidy. Rubbish and clippings may be found in concealed spaces and around steam pipes. The class of help is generally of an inferior quality and the fire record of the class is very poor. Printing labels or boxes is an incidental hazard. Strictly accommodation business. See Folding Boxes.

PAPER-HANGING FACTORIES—See Wall Paper Factories.

PAPER MILLS—Raw materials are wood pulp, rags, straw, hemp, old paper, flax, jute, small amount of powdered gypsum, clay, alum, sulphates of barium and calcium. The principal woods used are poplar, spruce, hemlock, pine, cottonwood, white birch and maple.

At the pulp mills, wood is received in logs about two feet long. There are several processes of making the wood into pulp. One is the grinding process where the wood is forced by hydraulic or steam press against a large grindstone kept wet with water. The wood is ground in this manner into a fine pulp. Water is then extracted in a wringer and the pulp is then pressed into sheets and baled. Another process is the sulphite process. The wood is received in logs about two feet long and is carried by a conveyor to a rotating machine having small knife blades which chip the wood from the logs with the grain. The chips are then conveyed to the digesting tank, which is usually a cast iron or steel tank twenty feet or so in diameter and about the height of a three-story building. The building in which it is located is usually one story in height with balconies around the tank. The pulp is then put in the tank and the cover of the tank securely fastened. It is cooked in sulphurous acid by a high steam pressure, and is then taken from the tank and all

oisture extracted, leaving it in a condition to be made into .per. Cooking or boiling takes about 18 hours, except in e slow cook method when it takes about 40 hours. The ılp yield is greater and stronger from this process than om the soda process.

Sulphurous acid is usually made in a detached fireproof ıilding where sulphur is cooked (allowed to burn) and the mes pass through running water into a tank where the id and water are converted into sulphurous acid. Instead sulphurous acid, acid sulphate of lime or magnesium is metimes used in this process.

The soda process is where the wood chips are boiled in lution of caustic soda and sometimes lime. Apparatus, ch as digesters and wringers, are similar to that in the sulıite process.

In the sulphate process, the chips are boiled in sodium lphate. In all these a similar process reduces a mass to pulp, then bleached in acids. Processes vary slightly, but r this purpose the process of newspaper manufacturing briefly described.

Wood pulp is received at the mill in bales. The bales are lit open and the pulp separated into layers about 2 inches ck. The layers are placed on a movable belt, which cars them to a cutting machine. There are two types of cutg machines in use. One is used in winter and the other in mmer. The type used in winter is similar to a metal um with three grooves cut on opposite sides, in which arp steel plates are placed. These revolve at high speed, d when the wood pulp is forced through the machine it cut into narrow strips about ¾ of an inch wide and 4 :hes long. The type of machine used in summer resembles very coarse circular saw, and there are many of them on e shaft, set about two inches apart. This machine cuts the lp much finer, and is used in summer because the pulp then much softer and can be more easily cut. This part the process is called shredding. The cut pulp is then rried by a belt to the top of the building where it is dicted into one of a number of separate tanks. These tanks e about 25 feet in height and 18 feet in diameter, construct-

ed of wood and filled to within 3 to 4 feet of the top with water. The water used is called chalk water, and is that which is squeezed out of the wood pulp in the final process of making the paper. Approximately 28 bales of pulp are put into each tank, a quantity of white clay resembling chalk mixed to a milky consistency, and also a small amount of rosin. This is churned from one to two hours.

The milky clay referred to is made in a separate tank, where clay is thoroughly mixed with water for about two hours, and at the end of that time is put in another tank where it is mixed again, so that there is no possibility of any lumps or hard substances remaining in the mixture. The mixture is then pumped to the beaters, which are large wooden tanks having covered paddle wheels which revolve and beat the pulp into an even mass. At the time the mixture enters the first beater about 25% of sulphite pulp is added, also a small percentage of alum and Prussian blue. The sulphite pulp is added to give strength to the finished product, as the fibers in the sulphite pulp are longer than in the cut pulp, this being due to the fact that in the sulphite pulp the wood is allowed to disintegrate with its own natural fibers, whereas in the cut pulp the fibers are cut into very short pieces. The Prussian blue is added to whiten the paper. Sometimes a small amount of old newspaper is added, and there are experiments under way at the present time to add a greater quantity of newspaper to cheapen the cost of manufacture.

In making wrapping paper, writing paper or other kinds of paper, such materials as rags, jute, straw, hemp or linen may be added to obtain the texture desired.

The pulp is then sent to a large tank where it is kept in motion by an agitator to prevent sediment. It is then forced through a Jordon engine which divides any large particles into small pieces. From the Jordon engine the pulp enters another concrete tank, and is pumped to a stuff chest where an even pressure is maintained and allowed to flow over the Fourdrinier screens. There is a headbox at the screens over which the water flows. According to the rate of flow will depend the weight of the paper, in that if more water

flows over the screens the more pulp there will be. The pulp then flows on a wire screen to a felt belt, and little jets of water spray on it to evenly distribute the pulp. It then passes through a wood and brass roller, then to several rubber rollers, where the water is entirely squeezed out of the pulp, and about this stage the paper leaves the felt and passes through several steam-heated metal rollers. The paper is held against the steam-heated metal rollers by a canvas belt. After passing through a great number of these steam-heated rollers it passes through several air-cooled metal rollers, which give it a finished surface, and is finally wound on a core. The width of the machine referred to, also the paper, is about 18 feet, and a finished roll of paper weighs approximately 3 tons. The paper is made at the rate of 585 feet per minute. This roll is then lifted to a cutting machine where it is cut to desired sizes, usually in three pieces.

The paper is then tested for weight and strength. Five hundred sheets 36 x 48 should weigh approximately 64 lbs., and have a strength of 9 lbs.

The water is drawn from the Fourdrinier screens by the aid of vacuum pumps. It is called chalk water and is sent to a tank where the lighter part is allowed to run off, and the heavier part containing some pulp is returned to the first tanks where the pulp is cut and mixed.

The paper machines are very large, sometimes 150 to 200 feet long, and contain many large and heavy parts, as can be illustrated by the fact that one roller weighs 14 tons. Each machine requires a 500 h.p. motor to operate it.

The hazards of this manufacture are, particularly, flash fires underneath the steam rollers, due to the accumulation of paper dust and a large amount of loose paper caused by breakage; the collecting of wood pulp dust around the bearings of motors and shredding machines, overheated presses, workshop for repairing parts, sometimes including forge, machine shop and woodworking features, storage of sulphide pulp and lime, friction and hot bearings in high speed motors, high pressure steam cookers, sorting tables, uncleanliness,

storage of rags and old papers and lack of blower system above machine to remove heat and dust.

Sprinklers in this class of risk sometimes give great trouble owing to the fumes of the sulphuric acid corroding the pipes, fittings and heads, making them inoperative.

Where there are sulphur burners they should be in a detached fireproof building.

Usually there are more than one of these paper-making machines in a plant, and it would seem desirable that a standard cut-off between them be maintained, so that in case of fire there could be at least one complete machine in working order. Particularly where use and occupancy insurance is carried this would be a desirable feature. (S. T. Skirrow.)

PAPER PATTERNS—Very susceptible. Stocks may be obsolete. Lines should be written with caution.

PAPER RULING—The machine consists of a flat wooden bed, in centre and between sets of wooden rollers located at either end. Cords are run over one set of rolls, through an ink trough or pad and rolled over the rollers at opposite end. The paper is ruled as it travels under these cords across the bed of the machine. For double ruling, springs are connected to a bar with tail-piece of cloth wet with ink. From this cloth, the ink runs down a series of needles set like a comb, and as the paper passes under the needles a ruled line is made. Susceptible stock. Fair insurance risks.

PAPER SIZINGS composed of soda ash, resin, alkalis and colors. In manufacturing, the hazards are direct heat for rosin kettles, drying ovens, mixing tanks, recoopering and painting barrels used in shipping the material. Poor fire record class.

PAPER STOCK—Rags, old paper or other material used for making paper. Serious exposure to neighboring buildings. (A K. O. class.)

PAPER TUBES—Mailing tubes, ribbon spools and the like. In manufacturing, raw stock is rolled paper, glue, pasteboard and labels. Processes are slitting, winding, cutting, gluing, and tube forming; all similar to paper-box making.

PAPIER MACHE—Produced by pressing the pulp of paper between dies or by pasting paper in sheets upon models.

rous paper is used, saturated with flour and glue. As each er is made it is heated. The form is then varnished, dried, llacked and again dried. Principal hazards are dry rooms, of lamp-black varnish, heating of glue and untidy prem-. Generally occupy poorly constructed lofts and employ a y poor class of labor. "Not attractive" fire risks.

ARABENZOL—A hydrocarbon extracted from coal tar htha. Very combustible.

ARAFFINE—A solid wax obtained from petroleum. ts at 125 to 135 deg. F. Crude paraffine is called scale .

ARAFFINE NO. 7—See Burnal.

ARAFFINE OIL—Heavy, non-volatile oil, high flash it.

ARAFFINE WAX (Lessons from a fire)—About 100 lbs. vax in solid form was wrapped in each burlap bag for ment. Ordinarily we would anticipate a great loss where is stored in large quantities as in this case, but the fire onstrated that even though the heat was very intense, wax simply melts and runs away except in a few cases re the liquid wax was ignited. There is a much larger age of wax than would be expected. Dirty wax can be aimed by melting it in a kettle, where the dirt settles to bottom, and the clean liquid wax can be drawn off.

ARANITRANILINE—A moist substance resembling ow ochre, received in 50-gallon wood casks; claimed to be -combustible and non-inflammable. Used in combination iron filings, borings and muriatic acid.

ARAPET—The portion of a wall extending above the . The usual height is one foot but the standard re-ement is three feet.

ARAPETS, while designed to prevent fires from spread-from one building to another over the roof boards, do prevent a fire from spreading to a raised roof, monitor : or roof structure on another building if they extend e the parapet.

ARCHMENT PAPER—Paper treated with dilute sul-ic acid, washed in water, dipped in solution of either

ammonia, sodium carbonate or zinc chloride. If wet, is apt to discolor from mildew.

PARIS GREEN is made of blue vitriol, sulphate of copper, arsenic and soda ash. Poisonous but without fire hazard.

PARISIAN IVORY—A nitrocellulose composition.

PARKESINE—A kind of pyroxilin or celluloid. The manufacturing process is very severe.

PARKS—See Amusement Enterprises.

PARLOR FLOOR—A name applied to the second floor where the steps from street lead directly to such floor. Usually occupied for parlor purposes, kitchen and dining room being on the first floor; commonly called "English Basement."

PARQUET FLOOR MANUFACTURING—Hazards of woodworking with varnishing and shellacking, gluing, oiling, painting. Boards that are to be laid in damp locations should have the underside coated with asphaltum. Stores engaged in this business sometimes have considerable lumber on hand, a generous supply of floor oil and wax, a circular saw and a machine for dressing floors. This class has a poor fire record.

PARTITIONS should be built of incombustible material. Wood is not recommended. In sprinklered risks, wood partitions should not be placed nearer than two feet from ceiling unless the upper two feet is thin glass in light wood frame. If partition is solid, it should extend midway between the sprinkler heads.

PARTY REINSURANCE—See Reinsurance.

PARTY WALL—A wall used to support floor or roof members of adjoining buildings. Should be at least twelve inches thick to allow four-inch space between ends of beams.

PASSEMENTERIE—See Embroideries.

PASTE—Is usually made of starchy substances such as dextrine, ordinary starch, etc. It is perfumed with essential oils.

PASTE COLORS—Aniline dyes are dissolved in hot water in large wooden tanks and allowed to cool, then run into large wood vats, and the precipitate treated with hydrochloric and sulphuric acid and alum. This is filtered through

cloth and a pasty mass secured which is put in a steel ixer with lithographic varnish, then through slow-moving lls, where most of the water is squeezed out, and dried in y rooms. No benzine, turpentine or alcohol is used in the ocess. An unprofitable class to insure. See Aniline Dyes.

PASTE FILLERS are mixtures of ground quartz, pigents, oil and japan.

PATENT AND ENAMELED LEATHER—Consists of veral applications of "daub" which is generally linseed oil id lamp-black or some other pigment. It is usually thinned ith naphtha. The main hazards are boiling linseed oil over ı open fire, the reducing of oil with naphtha, the mixing of mp-black, preparation of the "daub," japanning the leather, ıd drying ovens. Solutions of nitro-cellulose also used. . hazardous process. Poor fire record class. See Leather.

PATTERN LATHES, for turning shoe lasts, etc., are ıade so that the scroll pieces to be turned at one time are otated slowly and simultaneously with a pattern over which blank pointer passes. By following the surfaces of the attern, the pointer advances or withdraws by means of parallel or pantograph motion, rapidly rotating cutters) and fro from the various pieces to be turned. Large mount of refuse, high speed, danger from overheating bearıgs.

PATTERNS—Underwriters seldom write patterns without aving a share of the stock or machinery and usually limit ıe pattern item to not more than 10 per cent of the amount f the policy. Patterns are easily damaged and difficult to eplace without much labor. They should be stored in aults. See Dress Patterns; also Records.

PAWNBROKERS' STOCK—Considered good insurance mainly covering on silverware, jewelry and tools. Where ıe stock is largely wearing apparel, the risk is not as attracve. The stock belongs to the person pledging same, except ıe right and interest which the pawnbroker acquires by law hen accepting same. See Right and Interest.

PEANUTS are rendered unfit for food if subjected to fire amage, and little salvage can be expected. An analysis f burned *peanuts* after a recent fire showed that the oils,

fats, protein and ammonia contents were greatly reduced. Peanut shelling and grinding is a dusty process.

PEARLASH—See Carbonate of Potash.

PEARL BUTTONS—Snail, oyster and mother-of-pearl usually used. The snail is cheap, the mother-of-pearl expensive. A greater portion of all the shell is wasted in the cutting owing to the varying thicknesses. As the shell is worked the value increases. The mother-of-pearl veneers are the most expensive, as all the shell is ground from the back, leaving only the ornamental face. The thinner the veneer, the more expensive per pound. The thinnest cost $25 to $200 per pound.

Pearl is porous. As it is worked, it is kept soaked in water. Considerable water damage can result from a fire if the shell is left for any length of time in dirty or stained water, because it will become discolored. Even smoky water will lessen its value. The shell buttons are cleaned with pumice stone, emery dust and muriatic acid. Fire at a temperature of an ordinary baking oven will ruin shell if subjected to the heat for as much as ten minutes. The fire eats out the carbon, leaving only lime. Gas blow pipes and small furnaces are required for heating lead for buttons with lead backs. Fair fire risks.

PEAS, if wet and left in bags, will mildew and may be confiscated by health authorities.

PEAT—See Coal.

PEAT MOSS—Used in stables in place of straw, is cleaner, less dusty and presents less fire hazard.

PEBBLE MILL—A tumbler revolving on an inclined axis. Used for grinding. The material to be ground is put in the mill with iron balls or round stones. These grind the material as the machine revolves. See Ball Mill.

PEELEE FIRE DOOR—Vertical sliding, automatic, counter-balanced, tin clad (lock-jointed) fire doors used chiefly at freight elevator shafts. Approved and labeled by Underwriters' Laboratories.

PENCIL WORKS—May include steel and fountain pen making, involving wood, metal and rubber working and *machine shops*. Use linseed oil, benzine, alcohol, turpentine,

'arnish, lacquer, crude oil, graphite, white lead, dryers, amyl ıcetate and paraffine. Pencil rounding machines create con- ¡iderable dust and fine shavings, and should be equipped vith blowers.

Hazards of dry rooms, gluing, embossing presses, lacquer- ng by dip process, color grinding and mixing, graphite and iring in retorts, kilns for baking pencil leads. Fair fire risks f hazards are properly safeguarded.

Gold and Silver Pencils—Hazards of goldsmiths and silver- ¡miths, metal working, annealing, tempering and engraving.

Rubber Fountain Pen Holders—Hazards of rubber making, :alendering, steam heated mixers, cutters and tube machines, ¡andpapering, vulcanizing, dry rooms, buffing, use of rubber :ement.

Incidental hazards of printing and paper box making.

Copying Pencils and Ink Pencils are made of a concen- 'ated solution of aniline violet added to graphite and china ay.

Colored Pencils are made of Prussian blue or chrome yel- 'w mixed with white wax and tallow.

PENETROL is castor oil.

PENS—Fine quality of steel is used in making pens. The ıeet steel is cut into strips by power shears, and pickled in ılphuric acid bath, then rolled to the desired thickness. 'he blanks, i. e., the pieces of sheet steel the shape of a en, are cut out by means of die presses. They are pierced nd slit on presses, then heated in a furnace, and while still liable the name is placed upon them by means of a stamp- ıg machine. The form is then given the pen, after which ıey are hardened or tempered. Petrolatum is used to pre- ent rust. Machine shop hazard with gas-heated tempering urnaces. Fair insurance risks.

PENTANE—A clear, colorless, volatile, hydrocarbon liq- ıid. Boils at 95 deg. F. or less. Flash point zero F. Highly nflammable. It is obtained from the more volatile portions of petroleum. Used instead of candles in gas plants for the standardizing of light. Pentane vapor is nearly two and one- ıalf times heavier than air, but not quite as heavy as gaso- ine vapor. *The lamp* in which this is burned consists of an

elevated flat tank or reservoir of small size, mounted on a standard, with a small drop pipe leading to the burner. The pentane liquid is poured into the reservoir through a funnel mounted on the top, through which the air also passes that mixes with the pentane vapor. This mixture is effected in a small chamber from which is the drop pipe, and through this the gas passes to the burner. The supply of pentane should be regarded as having the same danger as gasoline, and proper precautions should be taken in its usage.

PENTINE—A benzine substitute, flash 102 deg. F. Classed non-volatile.

PENT HOUSE—The enclosure on the roof which is generally used for the elevator machinery or store room.

PEONINE—A red dye color.

PEPPER STOCK—Should never be stored near coffee or other delicate stocks as the heat from it very greatly injures these other stocks.

PEPS—See Flowers and Feathers.

PER CAPITA FIRE LOSS—See Fire Loss per capita.

PER CENT PROFIT INSURANCE—See Profit Insurance.

PERCHLORATE OF POTASH—A white crystalline solid used as an oxidizing agent. Not hazardous unless mixed with organic material.

PERFORATED PIPES are not recommended, as they allow the water to flow throughout the entire floor instead of only directly to the seat of the fire, as in automatic sprinkler equipments. The large water damage incurred, even at small fires, offsets the salvage which might otherwise be expected.

PERFUMERS, making toilet preparations, mix, sift and grind dry powders. Use alcohol, essential oils, nitric, hydrochloric and oxalic acids, paraffine and herbs. Confectioners' stoves usually used for heating salves. A swift burner. Rather poor fire record.

PERILLA OIL—An oriental vegetable oil used as a substitute for linseed.

PERMANGANATE OF POTASH is subject to spontaneous combustion whenever brought into contact with organic matter. This may occur either from foreign matter

aking into the packages, or from small crystals of per-anganate falling on the floor of a warehouse. Agitation, ich as caused by trucking, will facilitate the process. iould not be allowed to come in contact with glycerine.

PERMANGANATE OF SILVER—When warm solutions nitrate of silver and permanganate of potassium are ixed together permanganate of silver crystallizes out. In iotography, it is used as an oxidizing agent.

PERMANGANIC ACID—When gently heated it vola-.izes. If heated quickly it decomposes with explosion. It used as an oxydizing agent in the manufacture of colors.

PERMASOL—A volatile, inflammable liquid paint used on :lluloid goods.

PERNASEL—A dipping fluid for coloring glass bulbs. iflammable.

PERNITRIC OXIDE—Same as nitric peroxide.

PEROLIN—Composed of sand, iron slag, sawdust, paraf-ne oil; is a disinfectant and an ordinary floor oil.

PEROXIDE—See Chlorates.

PEROXIDE OF BARIUM, if exposed to the air and sun, iay cause spontaneous combustion.

PEROXIDE OF HYDROGEN—Made from barium ioxide. First it is diluted in water, then mixed with sul-huric acid. Its oxidizing properties are great. Same as inoxide of hydrogen.

PEROXIDE OF SODIUM is a yellowish white powder sed as a bleaching agent. Chemically it is a combination of he elements sodium and oxygen in equal proportions.

It is a powerful oxidizing agent, and has a strong affinity or water. In combination with the latter it forms caustic oda and hydrogen peroxide. As a fire hazard, this sub-tance ranks among the most dangerous found in ordinary nanufacturing plants. The danger lies in dropping the sub-tance on tables or floors, where it is liable to get wet, or n leaving it in uncovered vessels where water may be ropped on it. In combination with water it may heat so apidly as to set fire to surrounding material. (Gorham 'ana.)

Peroxide of Sodium—Principal use at present is for bleach-

ing straw in hat factories, and occasionally silk and high grade wool. For bleaching purposes a little is thrown into a tank of water. A violent chemical action takes place and unless there is a large quantity of water present, there will be a marked rise in the temperature. It is excedingly hydroscopic and if exposed to the air will rapidly absorb moisture. This causes a considerable rise in temperature but it is not likely that a fire will result unless water actually came in contact with it. It is usually shipped in ten pound tin canisters with a tight screw cap and in this condition is comparatively safe. It should not be stored in large quantities and should not be used inside of main manufacturing building, and should only be used by those who understand its danger and exercise proper care in handling it.

PERSIAN BERRIES—Used for dyeing in calico print works.

PET-PRO-CO SPIRITS—Flashes at 108 deg. F. in open cup tester. Graded as non-volatile.

PETROFRACTEUR—A powerful explosive.

PETROL is the first distillate from the crude oil as it comes from the well. It contains a large proportion of pentane. The name is a registered one but those using it usually refer to gasoline.

PETROLEUM OR CRUDE OIL—A natural rock oil composed of hydrocarbons. It is classed with natural gas and asphalt as bitumens—natural gas containing the more volatile members of the series, and asphalt the solid, while petroleum is composed chiefly of the liquid members, although it contains a small proportion of the solid and gaseous compounds. Other names of petroleum are rock oil, mineral oil and naphtha, the latter being employed especially in Europe for the Russian oils. In 1635 Pennsylvania settlers dug small wells and found it seeping in from surrounding rocks. Wells were driven to greater depths and the flow naturally increased. New fields continue to yield some, especially in Pennsylvania, Ohio, West Virginia, Kentucky, Texas and California. Of the foreign countries, Russia is the most serious competitor the United States has in the oil production. Petroleum is of various tints, but largely

green and black. The modern method of drilling for pe-
leum is similar to that used in sinking artesian wells. The
st prominent feature of the oil drilling outfit being the
rick, which is a tall pyramid-like wooden frame about 75
: high, 12 feet square at the base, and 3 feet at the top. A
rn drill is used. A round rock core is drawn out and an
ı pipe inserted. In many cases the oil does not flow when
oil rock is struck, and it is customary to explode a tor-
o in the hole, whereupon the oil gushes out with force
continues to flow until well or vein is drained. The
ap and rapid transportation of crude oil from the wells to
refineries is one of great importance. At first the oil
transported on carts, then by barges or tank cars, but
modern method is by pipe lines. Pipes are four to eight
ıes in diameter laid underground with bends in them at
ılar intervals to allow for expansion and contraction.
tions with pumps and storage tanks are placed every
›r 30 miles, the oil being received in tanks at one station
pumped from there to tanks at the next station. Since
petroleum contains more or less wax or paraffine, much
ıble is often experienced in the clogging of the pipes,
ecially in cold weather, and to clean them out, an instru-
ıt known as a "go-devil" is sent through the pipes. This
so constructed that it is forced along by the moving
ent of oil and scrapes the paraffine coating off of the
de of the pipes. Pipe lines now run from the Appalachian
on to New York, Jersey City, Philadelphia, Baltimore,
cago, Cleveland. The refining process consists of the
ıration of the component hydrocarbons by a system of
tional distillation. This is usually carried out by the
of horizontal steel cylinder tanks of about 600 barrels
acity each, with a dome on top of it, and from this dome
pipe which carries the vapor from the steam heated oil
condenser, which is a series of pipes surrounded by cold
er. When the oil is placed in the tank or still, and the
ım is turned on, the various increases of temperature
se the vapors of the various products to escape to the
densers intended for them.

'he first product is a light gas known as cymogen, for

medical purposes, escaping at 32 deg. F. The next is rhigolene, a petroleum ether sometimes called sherwood oil, at 65 deg. F. The next is naphtha at 80 to 120 deg. F. The next benzine at 120 to 150 deg. F. The gasoline product will vary from 190 to 200 deg. F., depending on oil's condition. Ligroine is a special grade solvent naphtha produced at a boiling point from 190 deg. F. to 250 deg. F. Then follow the illuminating oils of kerosene type. The residuum remaining in the still is then passed through a further process and produces paraffine wax and lubricating oils. The composite remaining at the ending is used for fuel oils.

Gasoline, naphtha or benzine, while lying absolutely motionless is not dangerous, but the slightest tremor will cause a vapor to rise, and this vapor coming in contact with gas or other flame will ignite, and a stream of fire will follow from the point of ignition to the body from whence comes the vapor and an explosion will follow. A lighted match was dropped into a barrel of benzine which was absolutely still and no explosion followed, but if that barrel had been disturbed a little and the vapor had arisen ever so lightly, an explosion would surely have resulted. These oils are classed as extremely volatile, and for that reason the insurance and fire departments are compelled to prescribe stringent laws for the storage and handling of them.—(Charles E. Jahne.) See Gasoline.

Petroleum Ether—Boils at 100 to 150 deg. F. Flash point zero F. See Benzine; also Ether.

Petroleum Naphtha—See Benzine.

Petroleum Oil may include any oil derived from crude petroleum.

Petroleum Soap—Common soap made from resin and low grade tallow containing petroleum bodies mechanically held.

Petroleum Spirits—Highly inflammable. See Benzine.

PETROLITHE—A dynamite largely composed of nitroglycerine.

PEWTER—An alloy of tin, lead and antimony.

PEYOTE—A drug, obtained from the roots of a cactus. *The narcotic* drug that is obtained produces results upon

ıe user somewhat analogous to those of opium. Sometimes ılled Mescal.

PHARMACEUTICAL CHEMISTRY is the branch reıting to the pharmacy, and includes the methods and azards of analyzing drugs, the preparation of medicines 'ith regard to the arrangement of their ingredients, and ıe consideration of poisons and their antidotes. The azards are mixing and milling, dry and wet processes, ften with steam or gas flame heat, and the resulting fumes r vapors, especially when confined, are liable to induce mild r severe explosions. Poor fire record class.

PHENOL OR COMMERCIAL CARBOLIC ACID is, hemically speaking, hydroxy-benzene, and is prepared from he carbolic or middle oils by treatment with caustic soda, r other alkali and precipitation with sulphuric acid, followed y refining by distillation. Not hazardous.—W. D. Grier.

PHITHALIC ACID—See Napthalic Acid.

PHONOGRAPHS—Dealers in this line may carry a large uantity of records equal to one-fourth to one-half of the alue of the entire stock. They are kept in open pigeonoled cabinets, and are very susceptible. Repairing and renishing machines are incidental hazards.

Records are made of such materials as shellac, wax, siliıtes, rosin, and lamp-black for making composition records; opper and brass sheets; copper and nickel salts for plating. 'rocesses are grinding, compounding, mixing and rolling tock for records; wax discs and cylinder making, buffing, olishing, plating, machine shop work and assembling. Poor re record.

PHOSGENE GAS—A very inflammable suffocating gas.

PHOSPHATE OF AMMONIA—Sometimes used for fireroofing scenery.

PHOSPHIDE OF CALCIUM—Obtained by distilling ›hosphorus over lime at a low (red heat) temperature. Decomposes water, releasing hydrogen.

PHOSPHIDE OF HYDROGEN—A gas that takes fire spontaneously when exposed to the air. Decomposes water, 'eleasing hydrogen.

PHOSPHORETTED HYDROGEN—When phosphorus

combines with hydrogen it forms a gas having a strong odor resembling garlic. This gas takes fire of itself when mixed with air and burns with a bright yellow light. It is this gas, sometimes seen at night over marshy land, which causes the light to be called "Will-o'-the-wisp."

PHOSPHORIC ACID—When phosphorus burns it forms a snow-like substance which dissolves very rapidly in water, forming phosphoric acid. Not hazardous.

PHOSPHORUS—Generally sold in cylinders, is commonly obtained from bones in which it exists, combined with lime. It is white and has a waxy appearance. It has so strong an affinity for oxygen that it is kept under water. Exposed to the air, fumes arise from the surface. This results from its uniting with the oxygen of the air. It takes fire from so little heat that it is necessary to be very cautious in experimenting with it. It is so eager to unite with the oxygen of the air that a little friction produces heat enough to make it unite with it and so quickly as to burn. It is used in most laboratories. In one of the colleges of Brooklyn a bottle containing phosphorus immersed in water was upset and immediately set fire to the surrounding woodwork. It gave off a luminous glow and had the appearance of a large fire.

PHOSPHORUS (red) amorphous, a reddish brown powder not subject to spontaneous combustion. Inflammable.

PHOSPHORUS (yellow)—A waxy solid. Will ignite at ordinary temperature if exposed to the air. Usually shipped under water. Besides being very poisonous, it is very inflammable.

PHOSPHORUS (white)—The same as yellow phosphorus.

PHOSPHORUS TRICHLORIDE—A very volatile, inflammable and fuming liquid.

PHOTO AND ADVERTISING MOUNTS—Cardboard used as mounts for photographs and the backs for signs. Similar hazards to paper box making with gluing and embossing. Accommodation business.

PHOTO-ENGRAVING—Half-tone work is the process which reproduces pictures or designs on metal plates by means of photography, usually by employing arc lights up to

amperes. The name half-tone is applied to this kind of ork because in printing the picture or design on the plate, glass with fine intersecting lines is placed between the ate and the negative. All that appears in the picture from ese fine intersecting lines are numerous small dots, each which results from the point of intersection of the above-entioned lines. It is necessary to mention at this point at in half-tone work the wet plate process is used, and is necessitates the use of collodion in preparing the nega-e. Collodion is therefore one of the important hazards. iis mixture is usually prepared on the premises, conse-iently open lights in the vicinity are dangerous. As it aporates quickly, and is quite expensive, the bottles in iich it is kept are seldom left uncorked. Electric lights e usually used in dark rooms where the plates are coated ith collodion. After completing the negative, it is printed the usual way on a copper plate sensitized with collodion receive the impression, and developed in chemical solu-ons including nitric, acetic and muriatic acids, then gently ated over a gas flame. It is then placed in an iron solu-on, which etches all the surface except the design or cture to be printed, and washed with a mixture of stripping llodion, rubber cement and benzole. The plate is then immed and cut out by power machines and is finally cked with a wooden block. A hazardous process.

PHOTO-ENGRAVURE PLATES are steel faced copper ates. Hazards are plating, washing plates in whiting and tric acid and coating with wax to prevent rusting. Method wax heating is important. Fair fire risks.

PHOTOGRAPHERS' DRY PLATE (mfg.)—Sheet glass sensitized (coated) with emulsion of gelatine and nitrate of ver, usually on a coating machine by cold process, the ate being passed through a trough of the solution and opped on a felt belt passing through the machine. No at; on the contrary, ice is put in tub under emulsion to ep it cool; dried in low temperature room. Chemicals ed include nitric, acetic, euramic acids, ether, ethyl alcohol, trous phenol, chlorides. In making colored plates, the ove process is also followed, anilines being used for col-

oring. Printing in some places is done by an electric printer operated by motor of light voltage and "lined" (blue lines put in) by violet rays with arc light under a hood. May use an autoclave for testing colors. Stock of plates is very delicate. They are stored in a dark room and are ruined if subjected to light as would be the case in a fire. They also would be spoiled by water. Hazards are indicated above and include photographing, developing and printing, dry rooms and gas heated developer. The fire record is fair.

PHOTOGRAPHER'S FLASH POWDER HAZARD.—The hazard of "flash powder" for use by photographers was explained by Washington Devereux, president of the Electric Club of Philadelphia in an address on fire prevention before the International Association of Municipal Electricians who met recently in Atlanta, Georgia. A great many stores have on hand stocks of "flash powders" without recognizing the extreme danger of the product. The amateur photographer buys a can of the substance without a thought of its deadly property, and the dealer, being almost equally ignorant, gives no word of caution.

Flash powders consist of pyroxilin (gunpowder) and magnesium powder or lycopodium and other extremely fine powders, being used in conjunction with gun cotton and other hazardous materials.

Mr. Devereux told of the explosion which occurred several years ago in the plant of Wiley & Company, chemical manufacturers of Philadelphia. Joseph Wiley was personally supervising the removal of a number of cans of "flash powder" when one of the cans exploded, instantly killing Mr. Wiley and two of his workmen. It is remarkable that more accidents do not occur in the handling of this substance. Inspectors in drug and jewelry stores where photographic supplies are handled would do well to make examination into the method of storage and handling of "flash powder."

PHOTOGRAPHERS' DEVELOPING SOLUTION consists of distilled water, silver nitrate, citric, oxalic and other acids, and solutions of a non-hazardous character.

***PHOTOGRAPHERS'* SUPPLIES**—Stock may include

h materials as acetic acid, hydroquinone, red prussiate of ash, meta-bisulphide, bromide, potash, sodium carbonate, ium sulphite, pyrogallic acid (crystals or resublimed), rdered or chrome alum, salicylic acid, ammonia alum. rery susceptible stock to insure.

'HOTOGRAPHY—In wet plate work, collodion is genlly used, and this is a hazardous process. In dry plate rk only mild acids are used and the process is not hazous. Dark rooms should have electric light rather than or kerosene oil. The latter is not a hazardous process.

'hotography has saved Insurance Companies many dol; in losses. A case brought to notice is where a Remndt oil painting was insured under a valued policy for a at many thousand dollars. A fire occurred on the owner's mises, and a claim was made to the Insurance Company a total loss on the painting. It was claimed that the fire ; so hot as to heat the canvas and make the oil colors ck. In this particular case the suspicion of the Company ; aroused by the fact that the fire was of very small protion. By having a photograph made of the painting, arged to various degrees and lightened in certain parts, vas shown that the cracks referred to were from the paint ng old and becoming dry. In the photograph, the cracks wed up with white streaks, whereas if the cracks had been m heat, they would have been burnt and shown up as ck.

n another case, a claim was made on an Insurance Comny for the loss of about twenty paintings (most of them old masters), on the floor and leaning against the wall of her a poor building in a poor neighborhood. To the mpany, it seemed rather strange that paintings worth 'eral thousands of dollars would be kept piled on the or against the wall in one spot and in this class of build;. Photographs were taken and it was discovered that the particular spot where the pictures burned, there was intense heat rising to the ceiling and other things in the om were barely scorched, but at the spot where the ntings were, it was found that the baseboard had been irely burned, that the rug was burned, but that the floor

was barely scorched and that the plaster on the ceiling showed evidence of a severe flame. It was deduced from this that there must have been something very inflammable added to the pictures to create their complete destruction, for it was inconceivable that the pictures themselves would create such an intense fire (it was believed to be alcohol). This belief led to the deduction that the "old masters" had not been destroyed, but that other pictures had been placed in their stead. By tracing a few of the parties involved, some of the pictures were discovered in another city, which pictures disclosed that the name of the artist had been daubbed out and another name substituted. An enlarging process in photography enabled them to find out the name of the artist and thus prove that a false claim had been made against the Company.

Photographs are often made of engine numbers on damaged automobiles, especially when they have been tampered with (so as to substantiate a false claim) and also of many other such conditions.

PIANO KEYS of celluloid present a fire hazard on account of lighted cigar or cigarette butts being carelessly laid on them.

PIANO MFG.—Lumber thoroughly dried in kiln is brought to the mill-run, sawed and planed into the proper sizes. Many parts are made of quarter-sawed pieces glued together. The wooden portions of a grand piano are referred to as consisting of cases and trimmings. The case includes the rims with the supporting beams or braces within, the legs and pedals. The rim is made of continuous pieces of wood (veneer) glued together. The outside finishing veneer is applied at the same time when forming is done. The processes consist of sandpapering and finishing (which includes staining, filling, varnishing, rubbing, flowing and polishing). The sounding board (or belly) is the most important part of a piano, and calls for a special kind of wood, thoroughly dried. The work on iron plate, wires and stringing, hammers, heads and actions presents very little fire hazards. The hazards are those of woodworking plants where varnishing is done. Sea grass is sometimes used instead of

loth for polishing cases. The rubbing varnish contains il and turpentine. The sea grass is very light and evidently onfines the heat more than cotton cloth or waste, as sponaneous combustion in waste cans is very frequent. It will eat up in a few hours sufficiently to warm the can. Good ısurance risks if hazards safeguarded. (See Piano Keys.)

PIASSABA OR PIASSAVA—A strong vegetable fibre nported from Brazil, used largely in making brooms. Should nly be stored in fibre warehouses.

PICAMAR—An oily inflammable substance obtained from ar.

PICKERS—A machine for picking fibrous materials to ieces. See Cotton.

PICKLING—The term is used in connection with plating isks, where the metal is cleaned by dipping in nitric and ulphuric acid.

PICOLINE—An oily inflammable liquid obtained from ır.

PICRAMIC ACID—Derived from picric acid.

PICRATES should be kept away from mineral acids, carers of oxygen, ozone, organic substances and sulphur. It obtained from carbolic acid or phenol by the action of tric acid. Used as dye for woolens and leather, and aking explosives. Highly explosive.

PICRIC ACID is highly explosive.

PICRIC RED—Isopurpuric acid with ammonia or other ıse; explodes with fearful violence at slight shock.

PICTURE FRAME DEALERS—Hazards are hand woodorking, usually only mitering of corners, varnishing, paintg and gilding. Susceptible stock. Other classes of art ›ods may be included in the stock. Poor fire record unless ell established and hazards safeguarded.

PICTURE FRAME MAKING—Woodworking hazards, per back making which introduces a mild paper-box makg hazard, painting, bronzing, varnishing, glazing, embossg mouldings on gas-heated presses. A poor fire record ass.

PICTURE FRAME MOULDINGS are usually made of *composition to resemble* hand carvings. The composi-

tion is a putty or dough made of melted rosin, glue and oil and sifted whiting. These are heated in a steam chest by live steam until in a plastic state. To form the ornamentation, the dough is pressed into moulds made of rosin and gum shellac which is oiled with kerosene and stearine to prevent the dough from adhering. The moulds are made from hand carved, close-grained, hard wood blocks.

The hazards are heating (not boiling) rosin, glue and gum shellac, also painting, staining, varnishing or gilding the mouldings. The composition in a soft state is non-inflammable but when dry and hard will shrivel up from heat. The models are very expensive. If their edges are charred or otherwise damaged they are worthless.—(W. H. Holl.)

PIECE GOODS DYERS AND FINISHERS—Use aniline colors and sulphuric and acetic acids in dyeing. For finishing have steam-heated cylinder machines for stretching and drying piece goods, folding and reeling frames (hand operated and no heat), also tentering machines. Glycerine, gelatine, gum arabic and starch are used for sizing; sizing tank usually heated by steam or gas. Fair insurance risks.

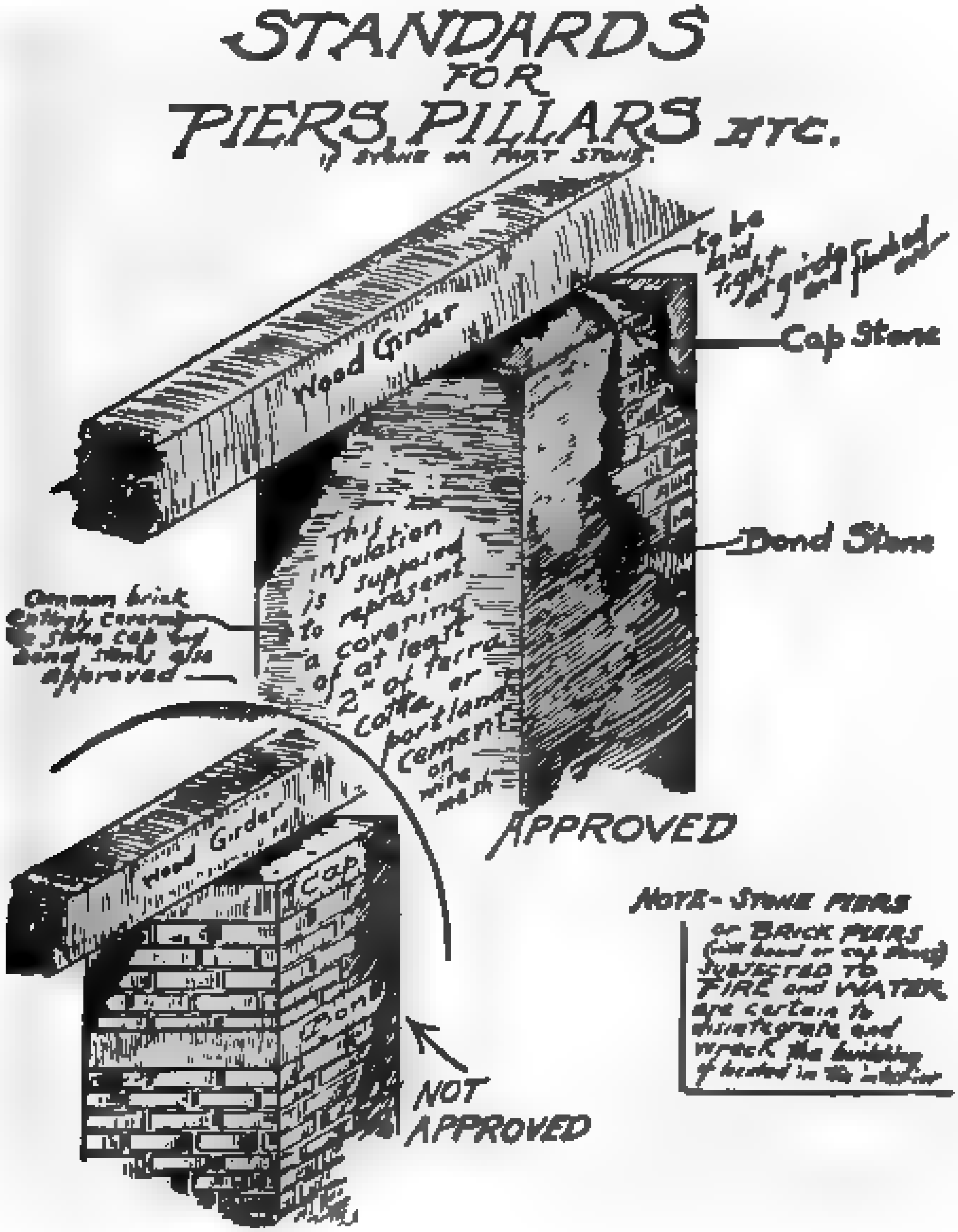
PIE BAKERIES—Hazards include mixing dough by machinery, preparing and cooking fruits and jellies on confectioners' stoves, lard and grease melting pots, baking. Usually greasy risks. The fire record is not very good.

PIER—The support of two adjacent arches or the support of the lower part of the building. If bond and cap stones are in pier they should be insulated. See Bond and Cap Stones.

PIER AND PANEL CONSTRUCTION—Applied to wall construction in which the main weights are carried on piers between which are thinner panels supported from story to story by beams resting on the piers.

PIERS—Open piers are usually built of crib construction, i. e., wood piling (usually creosoted), then the heavy wood timbers and cross bracing, and finally the heavy plank flooring. The frame covered pier is similar to above, except that it is covered over with a frame shed or enclosure. The *corrugated iron* pier is the type usually found in local territory. It has sides of corrugated iron on angle iron or on

wood stud, and roof of corrugated iron on wood purlins on steel truss or wood frame. The side walls of many such piers are simply a series of doors to facilitate the loading



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and unloading of vessels. The fireproof pier is of non-combustible material throughout, although some piers having wooden piling have been termed fireproof. The strictly fire-

proof pier has incombustible piling (concrete) with a reinforced concrete flooring or base, the sides of pier structure either concrete, or copper filled in with concrete or terra-cotta tile. All steelwork, including roof trusses, should be protected with at least two inches of concrete or tile. Skylights should be thin glass in metal frame with standard screen above. The area can be divided into smaller sections by the use of fire walls, which should extend to below low water line, be parapetted and have standard doors. In lieu of fire walls, curtain boards should be extended from the roof to divide the roof area and thus prevent the rapid spread of fire along the ceiling. These should extend to the lower side of the roof trusses, or lower if possible. Partitions or walls, enclosing the boiler room, oil room, rigging and other storage rooms should be of fireproof material with labeled doors at the openings. The fire protection usually consists of an approved standpipe and hose system, a supply of water casks with pails, and a special fire signal. A few of the latest types are protected by an approved dry pipe sprinkler system and day and night watchman service. The occupancy is usually general merchandise with fibre in transit. War material, including small arm ammunition, may be included. Automobiles enter to unload or load freight. The fire record of the unsprinklered non-fireproof piers is far from good. Fires have been spread by burning objects floating under piers, therefore we recommend planking for enclosing sides and ends of piers to extend to low water mark. Hazards may include immigrant stations with lunch counters, gas or coal stoves in workmen's lounging rooms, baling waste paper from railroad cars, and smoking. Pier fires are usually severe, owing to large areas. If steel work is unprotected it will buckle and twist.—(C. C. Dominge, in The Weekly Underwriter.) See Cotton; see Canals and Feeders.

PIGMENTS—The dry inert colors used in paint and color making.

PIGSKIN—See Sheepskin.

PILASTER—A reinforcement of a wall by increased thick-

ness at various points. Used mainly as an additional support for wide span roofs.

PILES—Large timbers driven into the ground to secure a foundation.

PILOT LIGHT—A small light burning constantly to ignite a larger light as occasion demands, as applied to cluster gas lights. Also small lights on electric circuits which keep burning when the current is on, as applied to electric irons.

PINE OIL is resin oil.

PINIC ACID—Obtained from rosin; inflammable.

PINKING—Cutting or scalloping the edges of ribbons or cloth. No heat is used.

PINTLE—A contrivance of cast iron, consisting of two thick circular plates connected by a solid cylindrical supporter, placed between posts between the floors of stories. Used in mill constructed buildings.

PINTSCH GAS—Manufacturing process. Petroleum oil is subjected to high temperature, in coal or gas fired retorts which converts it into a gas, which, after going through a purifying process, is pumped into compression holders at a pressure of 75 pounds or more. At this pressure the gas is carried by underground pipes to rail-car tanks. Oil should be stored underground as per requirement. Other apparatus consists of retorts, purifying cylinders and gasometer. The tar deposit is put in iron drums. The great danger is from escaping gas. Severe fire from this gas occurred in Grand Central tracks, New York City, several years ago. See Oil Gas.

PINTSCH TAR OIL—Flash point above 100 deg. F. Classed as non-volatile.

PIPE LINES, if above ground and used to convey hazardous liquids such as gasoline or crude oil, are not considered very safe. A short time ago the following was reported: "An overhead pipe line was used for conveying crude oil from Penn Horn creek on the Hackensack meadows to Bayonne for refining. It is believed the pipe was weakened by the shaking it received a month before when the munitions plant at Kingsland was blown up. The oil seeped out until

the surface under the pipe line was coated with it, and it is supposed a hot spark from a passing locomotive ignited it and a severe fire resulted." All pipe lines should be underground and securely bedded. See Petroleum. See Gasoline.

PIPE OPENINGS—In Buildings of Ordinary Construction, Single Floors. Flooring to be closely fitted around all pipes, except steam pipes, and each pipe to be provided with a satisfactory floor plate. Steam pipes to be fitted with metal sleeves in accordance with requirements of the local Board of Fire Underwriters.

In Buildings of Ordinary Construction with Double Floors, or Mill Constructed Floors—The rule for pipes applies as above and in addition the following is in order. Space between pipe and sleeve to be filled in with non-combustible material (mineral wool, asbestos, etc.), securely held in place by satisfactory ceiling and floor plates. Each pipe opening to be provided with substantial wood curbing extending 3 inches above floor. A water-tight joint to be effected between curbing and flooring by means of tar paper properly flashed around the curbing.

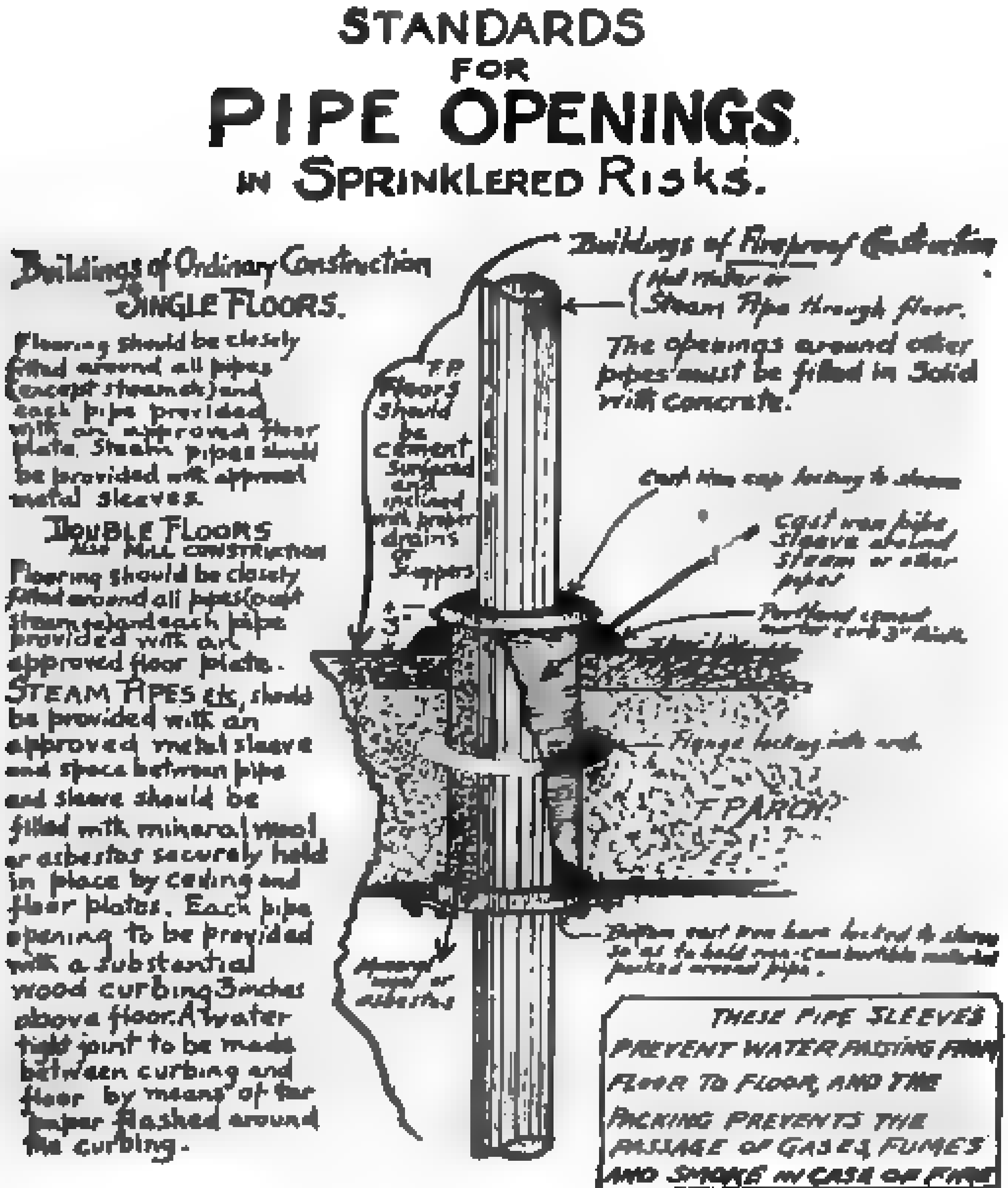
Fireproof Floors—Space between pipes (except those subject to unusual expansion, such as steam, hot water, etc.), and floor arches to be made water-tight by means of Portland cement mortar properly filled in.

Steam pipes, etc., to be provided with an approved water-tight metal sleeve cemented into floor as above, and extending 3 inches above finished floor surface. Portion of sleeve above floor surface to be protected from injury by a cast iron collar or by a curb of Portland cement mortar at least 3 inches thick. Space between pipe and sleeve to be filled with non-combustible material (mineral wool, asbestos, etc.), securely held in place by satisfactory ceiling and floor plates. See illustration page 515.

PIPE SHAFTS should be enclosed in standard shafts of concrete, terra cotta or brick, with standard fire doors at all openings and a thin glass skylight at the roof. Many fires, especially in fireproof office buildings, have started in these shafts, which contain electric cables and canvas wrapped pipes, and a "catch-all" for waste paper and rubbish. Fires

n these shafts are hard to extinguish. It sometimes becomes necessary to chop away walls and floors to locate the seat of the fire.

PIPE STOCK—See Iron Pipe Stock.



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PIPES (smoking pipes)—Briar root received in crude form, cut, bored, sandpapered, varnished and buffed. Holes are filled with stick shellac heated over gas flame. Gas heat used for glue and oils. Woodworking machinery creates

considerable fine shavings and dust, and should have blower attachments. Celluloid bits are in general use. At pipe factories, these are bored, threaded and polished. Fair fire risks if hazards properly safeguarded.

PI PI—A vegetable product used by tanners (non-hazardous).

PIPING—Doubling the diameter of a pipe increases its carrying capacity four times. Suppose a 2-inch pipe is used; the cross section 2-inch pipe contains 4 square inches, which is the result of squaring the diameter (multiply the diameter by itself). A 4-inch pipe will have a cross section of 16 square inches, which is four times greater than a 2-inch pipe. The orifice of a sprinkler is ⅝-inch diameter, or .39 square inch. See Water Mains.

PISE—See Pize.

PISSASPHALT—A mineral pitch.

PITCH COKE—Product of the distillation of pitch.

PITCH KETTLE—Usually a direct-fire heated brick set furnace. Used in breweries to heat pitch for the lining of kegs. Room containing pitching apparatus should be cut off in a standard manner. Superheated steam is used to melt out the old pitch in the kegs.

PITCHED ROOF—A sloping roof.

PIT PITCH—Made of gas tar.

PITTSBURGH CONSTRUCTION—A type of slow burning construction in which the floors are formed by planks laid on edge and spiked together.

PIZE—A mixture of straw and sunbaked mud.

PLACERS—Persons employed by brokerage houses to place insurance with companies. One of the main requisites of the business is to be frank and honest in the statements made about the risk to the underwriter or counterman. One false statement or "fib" will forever remain in the mind of those accepting the placer's propositions, and they will always be suspicious for fear that the placer is trying to "put one over."

PLAIN FINISH—No concealed spaces; or, walls without furring.

PLAITING **(or pleating)**—To fold into narrow widths

passing the cloth through gas-heated calender rolls. ıs connections to machines should be of rigid iron piping ıere possible.

PLANERS—Rapidly rotating blades mounted upon horintal shafts parallel to the latter, together with a feeding :chanism and table upon which the stock is laid in its pasge through the machine. There are four kinds, surface, ıtchers, flooring machines and dimension planers. Great al of refuse is made. Should have blower attachments.

PLANING MILLS—Sometimes found in connection th saw mills. The rough lumber is stacked around the mill large piles and is planed in the mill. The mill may be nply a roof set on posts as a protection from the weather. ıners should have blowers attached, but in outlying discts refuse is usually only swept up by hand. Gasoline gines may be used for power. Fierce Burners. Fair fire :ord if blowers and shaving vault are standard. See Saw lls; see Shaving Vault.

PLANS (REVIEWING)—In order to obtain the lowest ıurance rate, the temporary plans of a building, as soon as :y are completed, should be carefully reviewed by an in-ance engineer thoroughly conversant with rate problems. is review should take place in the office of the archi-ts or fire insurance company and the architect and owner property should be present. While no set rules can be ren, the following will serve to at least give the inexrience an idea of the main points to be covered in critiing a set of plans. These suggestions refer especially to e-resistive buildings.

(1) **Floor Areas** should be as small as the demands of e business will permit. Five thousand square feet is suffi-nt for one open area. If the area exceeds the above, it is visable to have 12" brick division fire walls with standard e doors at each opening.

Note: Large areas increase the chance of a heavy loss on e contents of a building.

(2) **Floor Surfaces** should be of incombustible material, e., *cement or similar* material, and where possible, should

be provided with approved scuppers or floor drains to carry off the surplus water.

Note: Wood floor surfaces usually have an air space underneath which allows the fire to spread over the floor. Without floor drains, many a valuable stock has been ruined by the water being unable to escape.

(3) **Height** should not exceed eight (8) stories.

Note: Fire Department hose streams are seldom effective above the sixth (6) floor. The firemen above this height must depend upon the standpipe which is not always in good condition.

(4) **Structural Steel or Ironwork**—Even if in a concealed space or piercing a shaft should be encased in at least 2″ of Portland cement or 2″ of terra cotta.

Note: The fire records show that **unprotected** steel or ironwork is not reliable in a serious fire. The intense heat will warp and twist and allow the superstructure to fall.

(5) **Floor Openings** throughout the building (consisting of elevators, stairways, vent shafts, light shafts, dumbwaiters, chutes, etc.) should be enclosed from basement to roof in at least 6″ concrete or terra cotta shafts with approved metal-clad doors (automatic) of labeled type.

Note: Floors should have as few openings as possible. Fires travel swiftly up these openings unless protected as above.

(6) **Skylights** should be placed over all shafts (stairs, elevators, etc.), composed of thin glass on metal frames with approved wire screens above.

Note: Wired glass skylights are not permitted as they prevent the fire and smoke leaving the shaft, whereas the thin glass easily breaks and allows the fire and smoke to escape. The wire screen above the skylight prevents any possible flying brands from outside buildings entering the shaft.

(7) **Window Openings** (on exterior walls or in courts) should be protected by wired glass windows in hollow metal frames (labeled type) or standard metal-clad lock-jointed shutters.

Note: Labeled wire glass windows are preferred in that

y are more likely to be closed in case of fire. They
re a double purpose, i. e., they prevent an exposure fire
ning access and prevent fire from traveling from one floor
another on the outside of building.

8) **Boilers** should be placed under the sidewalk or in a
-story brick extension, cut off with a 12" brick wall and
automatic lock-jointed fire door at the opening.

Note: Experience shows that the boiler room should
cut off from the balance of the risk mainly on account
combustible material coming in contact with same.

9) **Hazardous Work-rooms** (where lacquering, japanning,
fing, dipping, experimenting, etc., is done) should be cut
from the balance of the floor by 12 inch fire walls with
automatic lock-jointed fire door at each opening.

Note: Fires usually start in these rooms, therefore they
uld be cut off as above.

10) **Protect the entire building with modern appliances
merit for giving alarms of fire** and for putting out fires,
soon as discovered, before they have a chance to spread.

Note: The best known method of extinguishing fire is
automatic sprinkler (which consists of iron piping filled
h water or air, securely supported) immediately beneath
floors, i. e., the ceilings. At intervals of 8 to 10 feet are
ached sprinkler heads having deflectors designed to spray
er over the entire area.

PLAN VIEW—The drawing of any one floor of a building
king down on it from a point above the drawing.

PLANT—The outfit of machinery, stock and fixtures
essary for carrying on any kind of business.

PLANTATION RUBBER—See Crude Rubber.

PLASTER—A mixture of plaster of Paris, sand, wool or
mal hair. Plaster is made by heating gypsum sufficient to
ve off three-fourths of all the combined water which it
tains, and grinding finely the hydrated residue.

PLASTER BLOCK—Plaster block, if solid and not less
n 3 inches thick or cinder plaster block can be expected
give a very good account of itself (as a protection to
nwork) in very severe fires, comparing very favorably,
hough not as reliable as terra cotta tile or common brick

or good concrete. To prove this fact, attention is called to the excellent manner in which the plaster block stood up in the Mansard in the Equitable fire, although the intense heat melted brass in many cases.

The building code for New York City will permit 3-inch solid plaster block as standard insulation for iron columns, 2-inch blocks for lower flanges of girders and 1½-inch blocks for lower flanges of beams.

For all shafts, whether stair, vent or elevator, blocks must be at least 4 inches thick.

PLASTER BOARDS are made of gypsum plaster with a binder such as wood pulp, wood fibre, excelsior. Made in sheets one-half to one inch thick, and used extensively as a fire retardant furring. The plaster is received in bags, mixed with water, pressed in roller machine where the fibre is added, sawed into slabs and air dried. Drying is usually done on the roof of the building or a lattice frame enclosure as a separate structure. Large amounts of excelsior or other fibre stored in premises is a menace. Construction of building is usually light frame. Not very attractive fire risks.

PLASTER FIGURES—Made by moulding plaster and using wire or excelsior as a binder. The moulds are sized with glue, dried in dry rooms, shellacked and coated with paint or bronzing liquid. Hazards are heating wax or glue by direct heat, dry rooms, excelsior storage, painting and untidy premises. Poor fire record.

PLASTER OF PARIS is calcined and powdered gypsum.

PLATE GIRDER—A large steel girder used to span an arch or opening, as for instance, over the top of the proscenium in a theatre.

PLATE PRINTERS—See Engravers. See Etching.

PLATFORMS—Temporary overhead sidewalks are sometimes put up in front of buildings in course of construction so that pedestrians can traverse the street, and workmen can carry material into the building. Sometimes electrical apparatus for lighting and hoists are installed under these platforms. As all wiring, switchboards, etc., are for temporary use, they are usually very carelessly installed. In April, 1918, a severe fire occurred underneath such a platform at

the Pennsylvania Hotel, and was evidently the result of defective electric installation at switchboard. The fire was severe enough to totally destroy over 150 feet of the limestone front under the platform and scorched buildings on the opposite side of the street. See Course of Construction; see Builder's Risk; see Spall.

PLATINUM—A metal used largely in the manufacture of chemical utensils, owing to its immunity to the effects of acids, heat, etc. Melts at 3,191 deg. F.

PLINTH—The square, lowest member of the base of a column or pier.

PLODDER—A machine used in soap making. It is somewhat cylindrical in shape, about 5 feet long, steam heated and power driven. Soap is fed to the machine through a hopper. A plunger in the centre of the plodder forces the soap through an aperture at one end and the soap emerges in the form of a long bar and is then cut up in desired sizes and wrapped.

PLUMBAGO—A mineral lead used in crucible manufacturing. As this substance passes through intense heat during the manufacturing process, it suffers practically no fire damage, and is considered good insurance.

PLUMBERS—Usually carry only a small amount of insurance on stock, the value being mostly in tools and fixtures. May have gasoline torches or furnaces, charcoal furnaces, forge, and do light metal working, painting. Good fire record if well established.

PLUMBERS' SUPPLIES MANUFACTURING—Hazards of wood and metal working, sandpapering, dip staining, painting, lacquering, varnishing. Not an attractive class as a rule.

PLUSH—Is of different grades and weaves. Cop yarn (cotton and worsted) is for warp and woof. The plush piling is silk, cotton and mohair woven together in one single strand. The cop yarn, which furnishes the top and bottom body fabric, is woven together with the plush piling by means of a weaving machine, and a knife attachment separates the top and bottom warps or fabrics. Cop yarns come in *skeins. In this process* very little lint or flox is produced.

The "tigers" or rough combers of plush, however, produce considerable silk flox, which should be cleaned up daily. Fair insurance. See Silk Plush.

POISONOUS ARTICLES of Alphabetical List of Charges for Merchandise in Listed Storage Stores in territory of the New York Fire Insurance Exchange. The Standard Dictionary gives classifications: (1) irritants; (2) narcotics; (3) septics. They also may be classified as vegetable (v); mineral (m); and gaseous poisons (g). The letters (v), (m), (g) will stand for three divisions. P stands for poisons. P-I means Poison-irritant. P-M means poison-mineral, etc.

P-I, acid arsenic.

P-M, acid oxalic.

Note: Picric acid is an explosive.

P-2, aconite root or leaves.

P-M, barium salts are poisons.

P-M, copper sulphate (blue vitriol).

P-M, disinfecting fluid. As a rule these fluids contain poisons.

P-M, insecticide (London purple).

P-M, iodine.

P-G, myrbane oil.

P-G, Nux vomica.

P-M, creosote.

P-I, Paris green.

Note: Copperas (sulphate of iron) does not contain any copper and it is not considered poisonous. It is soluble in water and appears in the trade in large crystals.

P-M, potash, bioxalate of.

P-M, potash, oxalate.

P-M, potash cyanide.

P-M, potash prussiate (also red prussiate of potash or ferricyanide of potassium). Also yellow prussiate or ferrocyanide of potassium.

P-M, soda, prussiate of.

P-M, soda, yellow prussiate of.

P-M, sodium, cyanide of.

P-2, strychnine seed.

***POISONOUS* SUBSTANCES**—Many have no fire hazard

whatever, but care should be used in storage warehouses to see that they are stored on the lowest floor of the building, and if possible segregated from other commodities. Fire, or the water thrown to extinguish a fire, may cause containers to burst open, and the poisons may be scattered about and contaminate other goods, which, in many cases, would make them total losses or render them useless for consumption.

POLE-PLATE—A longitudinal timber resting on the ends of the tie beams of roof.

POLICY—A personal contract between the assured and the company. When the property covered is sold or transferred to a new location, the policy does not cover new owner nor new address unless so endorsed by the insurer.

POLISH AND POLISHING COMPOUNDS may contain such inflammable agents as will make the flash point of mixture 80 deg. F. or lower. May include an abrasive material, gasoline, chlorates, permanganate, nitrates, varnish, mineral and vegetable oils. Inspectors should always take a small sample for the purpose of making a fire test.

POLITICS—The truth of the statement that there is a fire hazard in politics, although but vaguely comprehended by the average citizen, comes oftentimes with distinct emphasis to those interested in maintaining municipal fire departments in a state of high efficiency. Politics may interfere directly by forcing fire chiefs to fill their ranks with men physically incapable and sometimes insubordinate, and also indirectly, by tampering with the building department in such manner as to allow the flagrant disregard of most needful precautions.

POLYCHROME—Plaster of Paris statuary and ornaments tinted with chrome colors to give them the appearance of ancient ware.

POOL ROOMS—Tables are usually bought from the manufacturer on the installment plan. "Ivories" must be warm for good playing, hence, unless the place is steam heated, large pot stoves are usually employed. Smoking hazard. Place may be used as a "hang-out." Generally a poor fire record class. *(W. Lyddon.)*

POMPIER LADDER—One with a centre pole with a hook at top and rungs projecting on each side of post.

POP-CORN MANUFACTURING—Raw stock is corn, molasses and glucose. Work consists of sugar coating and making pop-corn into balls and cakes. Hazards are coke and gas-heated poppers, and confectioners' stoves.

POPPY SEED—May not be stored in a stipulated warehouse.

PORTABLE OVENS used by bakers, usually gas heated, should set on at least 4 inches of brick on sheet iron (with air space) and a safe distance from all woodwork, and be vented to a proper flue.

PORTLAND CEMENT—Composed chiefly of lime, alumina and silica.

POST-CARDS—Picture post-card making includes designing, embossing, lithographing, printing. Air brushes are used for coloring. A poor fire record stock. (H. Adams.)

POSTEL CLEANING FLUID—Contains carbon tetrachloride and about 60 per cent benzine.

POST INDICATOR, or Indicator Post. See illustration on sprinkler diagram, page 636.

POSTS—Square or round timbers set on ends; used for corner supports.

POTABLE GOLD—Gold when combined in solution with ether, naphtha or essential oil.

POTASH—In Great Britain, potash is now obtained from blast furnace dust by a process consisting primarily of adding common salt to the charge of the furnace, which releases the potash present in the ore and causes it to be volatilized with the emerging gases as potassium chloride. Potash can be similarly obtained from fumes and dust from cement kilns. The main sources from which potash has been produced in the United States are: Silicates, such as feldspar and green sand; kelp; salines from lakes; furnace or kiln fumes of iron works or cement works, and alunite. It is conceded that the cost of producing potash from silicates is too high to be profitable. Potash from kelp has received investigation. The two most important plants, those of the *Diamond Match* Company and of the Hercules Powder

y, have closed since the cessation of war. It is that they do not consider this a profitable source for Hydrate of potassium.

ASSA—An alkaline salt substance.

ASSIUM—Obtained from potash, is very difficult to cause it is continually uniting with the air, but the be shut out by placing the potassium under naphtha. a bluish white color and is quite soft. If potassium exposed to the air, it tarnishes at once, and in a short all turned to potash, the oxygen of the air uniting If you throw a little piece of it upon water, it steals e oxygen from the hydrogen of the water and flies e surface burning with a beautiful violet flame. The the hydrogen set free by the union of the potassium oxygen of the water.

ASSIUM ALUM is common alum.

ASSIUM CHLORATE—In the dyeing of fabrics potassium chlorate is used as the oxidizing agent, considerable danger of fire due to the rapid oxidation aniline dye and the chlorate. Not inflammable, but ence increases the intensity of fire by the evolution en. See Chlorate.

ASSIUM CYANIDE—A heavy white solid. Fire not serious.

ASSIUM METALLIC—See Metallic Potassium.

ASSIUM NITRATE—White crystalline salt, classed inflammable and not dangerous, but its presence s the intensity of fire by the evolution of oxygen. re, also Saltpetre.

ASSIUM PERMANGANATE—A purplish crystalline in oxygen. May cause fire when mixed with combustible material.

ASSIUM PEROXIDE—See Sodium Peroxide.

ASSIUM PICRATE—When mixed with water is used itute for yellow ink in coloring maps.

ATO CHIPS—Power machines are used for paring ng. The slices are cooked in grease by direct or inre. Greasy risks. A poor fire record class.

POTATO ETHER—Exists in the crude spirit distilled from grain, grape, husks, etc.

POTATO IVORY—Artificial ivory made from good potatoes, washed in dilute sulphuric acid and boiled in same solution. They become solid, then are washed and slowly dried.

POTELINE—Composed of gelatine, glycerine, tannin, zinc white and sulphate of barium.

POTENTITE—An explosive compound containing a nitrated gun cotton.

POT STOVES—Made of an unlined iron casting varying in thickness from ⅛ to ¼ inch and set on three legs. Many of the stoves are too small to properly heat the entire floor, and in consequence the fire is forced and the fire-pot kept red hot. This condition causes the casting to crack. After these cracks appear the pressure from the heat and fuel within spreads the opening, which soon becomes large enough to allow the burning fuel or sparks to fall out on the floor. Any stove having an unlined fire pot and standing on three legs should be prohibited. Cracked fire pots should be instantly repaired. (C. W. Brandt.)

POTTERIES—Kiln construction and condition should be closely inspected, as well as exposure to woodwork, because intense heat is developed in same. The preparation and handling of glazing and decorating compounds, and packing material are important features. Fair insurance risks.

POUCE—Fibrous dust from heckling in flax mills; very inflammable.

POUNCE—Powdered bones of cuttlefish mixed with resin.

POWDER (FLASH)—Usually consists of pyroxiline (gun cotton) and magnesium powder. See Photographer's Flash Powder hazard.

POWDER BLUE—Is starch, blue pigment wax and alum.

POWER HOUSES are generally F. P. construction with approved electrical equipment. Considered desirable insurance.

PRECIPITATED RESINATE OF ZINC—See Resinate *of Zinc. See Zinc.*

PREFERRED BUSINESS (so-called) is insurance on risks of minimum hazard or maximum protection, such as dwellings, fireproof buildings or sprinklered risks.

PREMIUMS—Companies must accumulate sufficient reserve from premiums collected each year to pay for large losses occurring from conflagrations which, as a rule, occur every few years. See Earned Premium.

PRESERVATION OF TIMBER—Several methods are used to artificially preserve timber from decay. The sap may be expelled by hydraulic pressure and replaced by chemical fluid, or the timber may be saturated with some chemical fluid which will combine or act upon the albumen and prevent decay. Usually total loss fire risks. See Wood Preservatives.

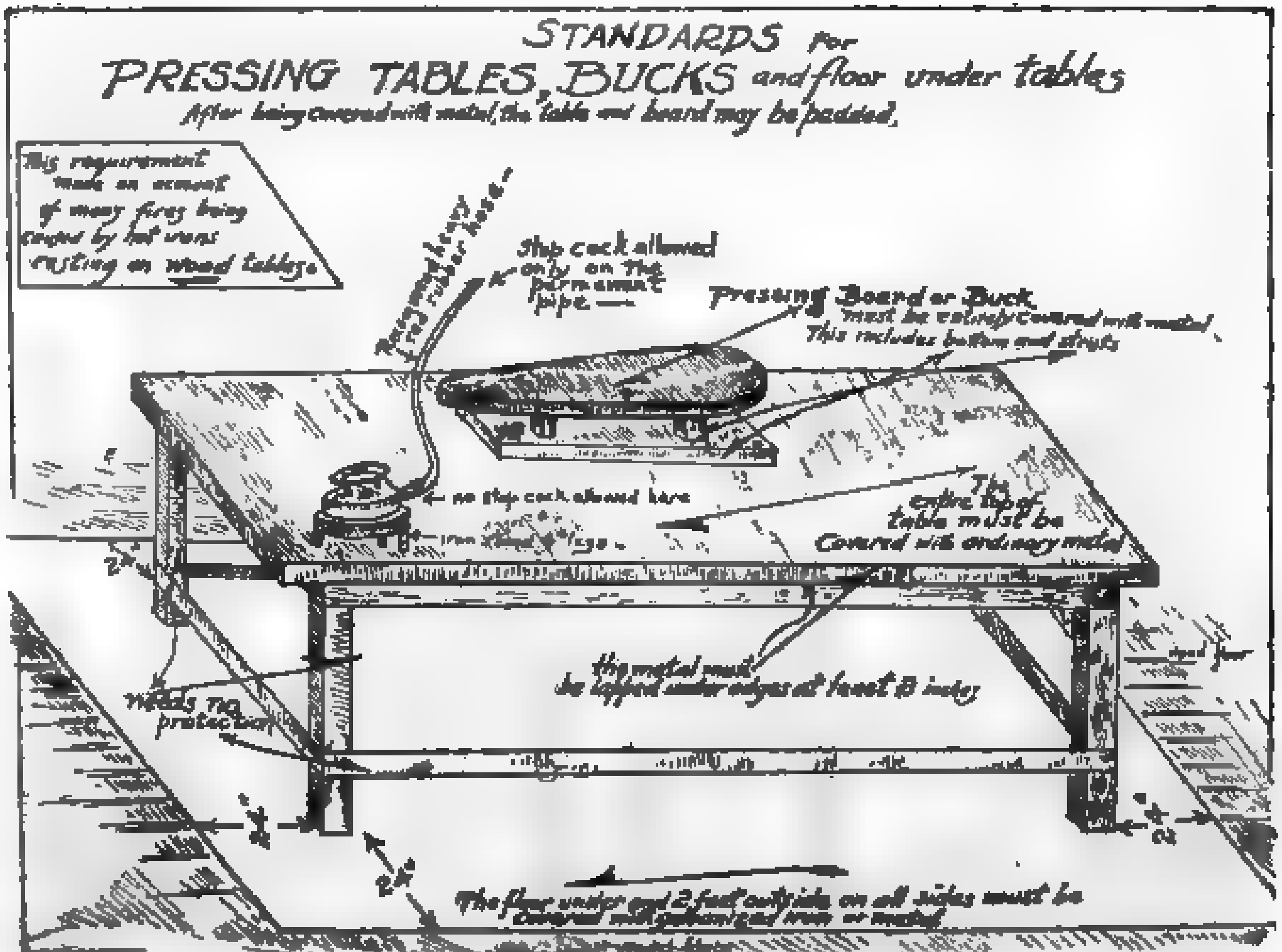
PRESERVES, MANUFACTURING—Machines are used for paring and slicing the fruit. Gas or coal-heated kettles or pans are used for cooking. Cans or bottles are usually filled by hand and cold paste is used for labels. Not a very attractive class.

PRESERVING AND FIREPROOFING Natural and Artificial Foliage. See Artificial Flowers and Feathers.

PRESSING IRONS (electric) should be made foolproof. The temperature of a flat iron for safe and satisfactory use is from 400 to 600 deg. F. This temperature is not dangerous, but when the irons as now designed are allowed to remain with the current on continuously, then the temperature rapidly increases to 1,200 to 1,400 degrees, or even 1,800 degrees in some instances, and the iron may reach red heat. The hazard may be overcome by means of a new device called a thermostatic switch placed in the iron, and which automatically cuts off the current when the temperature exceeds a predetermined range, usually 400 to 600 degrees. See Pilot Light.

PRESSING TABLES in tailor shops. The boards and bucks should be covered with metal. Also floors under and 2 feet at sides of tables. Many fires are caused by hot irons resting on woodwork.

PRESSURE—How to figure pressure on the top line of a sprinkler equipment. Take a building seven stories high, or


STANDARDS for
PRESSING TABLES, BUCKS and floor under tables
After being covered with metal, the table and board may be padded.
This requirement made on account of many fires being caused by hot irons resting on wood tables.
Stop cock allowed only on the permanent pipe
Pressing Board or Buck must be entirely covered with metal. This includes bottom and struts
no stop cock allowed here
The entire top of table must be Covered with ordinary metal
the metal must be lapped under edges at least 8 inches
Needs no protection
The floor under and 2 feet outside on all sides must be covered with galvanized iron or metal

) feet above the grade, with a pressure of 40 pounds at the ıain hydrant. Multiply .434, which is the pressure for each »ot of elevation, times height (80 feet), which equals 34.7 ɔunds. Deduct 34.7 pounds from the pressure at the main 10 pounds) which leaves a working pressure of only 5.30 ounds on the top line of sprinklers. Note.—A column of ater 12 inches high having an area of one square inch eighs .434 pound. See Water Pressure.

Pressure—Assume a gravity tank is 12 feet high and eleated 20 feet above the roof and sprinkler heads are one ɔot below the roof. Take 12 feet plus 20 feet plus 1 foot qualing 33 feet x .434 equals 14.32 pounds pressure on highst line of sprinklers. Note.—The combined pressures of ravity tank and pressure tank cannot be added, for in case f fire, the water will first be used from the pressure tank ntil the pressure is below that from the gravity tank, then he water will flow from the gravity tank.

Assume, in the case of a pressure tank, that it is eight feet bove the roof and sprinkler heads one foot below the roof. ıdd 8 feet plus 1 foot equals 9 feet x .434 equals 3.9 pounds ressure, plus the pressure showing on gauge on pressure anks, say 75 pounds, equals 78.9 pounds pressure on highest ne.

PRESSURE TANKS of sprinkler systems, steel or wrought ron, are two-thirds full of water and one-third of air. A auge to show height of water in the tank is placed at the nd of tank. Seventy-five pounds pressure is usually mainained. Pressure tanks operate prior to gravity tanks when he water flows through sprinkler pipes. The pressure of ater in the pressure tank holds shut the check valve on the iser leading from the gravity tank. When the water from he pressure tank is exhausted or the pressure reduced below hat on the check valve of the gravity supply, the water from ravity tank starts to flow.

Pressure Tanks—A pressure tank, even though holding ess water than a gravity tank, is more desirable for prinkler equipments on the theory that a certain amount f water delivered under a heavy pressure is as effective as much *larger amount* delivered under a light pressure.

To ascertain if water is at proper level in pressure tank, first close pet cock at the bottom, then open valve at top of glass gauge, then open valve at lower end of glass gauge and the water will rise. After finding water level, close lower valve in glass gauge first, then close valve at top of glass gauge and open pet cock at the bottom. A leaky check valve will tend to reduce the air pressure in the tank, for if the water is allowed to flow past the flapper, the air in the tank is allowed more room, therefore the pressure is reduced. See Sprinklers.

PREST-O-LITE (acetylene gas)—A fire in one of these plants demonstrated that acetylene gas itself will explode if compressed with air. Excessive heat and high pressure will also cause explosion.

PRIME—To put on the first coat of paint. In sash, door and blind factories benzine thinned paint is generally used.

PRINTING HAZARDS are composing, ink mixing, press work, wrapping, benzine or a substitute for cleaning presses, oily waste, waste paper, oily floors. Job presses are used only for small work. In this type of press, the type bed and tympan (sheet holder) come together on a vertical plane. Metal should be placed under all presses to prevent floors from becoming oil soaked. The fire record is usually good. See Cylinder Press. See Linotype Machine.

PRINTERS' INK—See Ink.

PRINTERS' ROLLERS are made of glue, glycerine and molasses on a steel core. There are two kinds, one for summer and one for cold weather use. The former is made of a harder mixture to withstand heat. Plants manufacturing rollers have a good fire record as a rule, although stock used will burn swiftly when on fire.

PRISM LIGHTS—Used principally on extension skylights in order to lighten dark locations. In New York City they are classed as thin glass unless the part in the valley is one-half inch thick, or unless glasses are not more than four inches by four inches on metal frame, in which case glass *must* be one-half inch thick over all and one-fourth inch *thick in valley*. See Sun's Rays.

PRISONS—Inspect for workshops, lighting, heating and ousekeeping. Incendiary hazard always present.

PRIVATE DWELLINGS—See Dwellings; also F. P. wellings.

PRIVATE FIRE PLANTS—A steam fire pump capable f furnishing at least two good fire streams, should be proided and connected directly to standpipe system, with gate nd check valves in such connection, taking suction preferbly from city main through a connection not less than 4 iches diameter, or in the event of this supply not being vailable, the pump to take suction from a reservoir of say 0,000 gallons' capacity, with a possibility of some variation ccording to the special case under treatment, such reseroir to be filled by connection to the city main, automatically ontrolled by float valve.

The pump and boilers should be cut off from the building referably by a fire wall, in which case the sill at the doorray should be at least two feet above the basement level, or this is not possible, a dwarf wall not less than two feet igh should be provided, which would prevent flooding the ump and boiler room in the event of the water which finds s way into the basement reaching the depth indicated. A ifficient quantity of steam to run the pump should be kept at all times and an engineer on duty night and day.

A signal system with a station on each floor with gong id indicator in the engine room for the purpose of notifying le engineer of the location of a fire and when the pump iould be put in operation.

A watchman should patrol the building at night, and during the day on Sundays and holidays, making hourly rounds, record of the rounds being made on an approved watch ock, and stations connected therewith to be located on each oor and in such manner as to require the watchman to atrol practically all parts of the building.

PRIVATE WATER WORKS—See Water Systems.

PRODUCER GAS PLANTS—The producer and all appaitus connected therewith should be safely set on a solid oundation, and all platforms used in connection with genrators should be of incombustible material. Producer gas

is made by partial or incomplete combustion of coal in the presence of an air supply which is regulated, and leaves no combustible residue. For detailed description, see rules published by the National Board.

PROFIT INSURANCE—Extreme care should be exercised in writing this class of insurance as many brokers' forms read "company shall be liable for a loss of profits equal to, say, 20 per cent or 25 per cent of the value of merchandise insured." With this form the stock may only suffer a 1 per cent fire loss and yet the company would be obliged to pay a 20 per cent or 25 per cent profit loss. The form should read that the loss would be a certain per cent of the value of the **damaged merchandise** (not the value of the merchandise insured). The best form from a company standpoint is one that follows the stock adjustment. Only competent underwriters should accept profit insurance. The following will illustrate the reason why large concerns carry percentage profit insurance:—A large woolen firm has stock of piece goods and is well stocked up, their fall stock being all in. A fire occurs and they sustain a total loss. Their own mill cannot fill orders for three months, therefore they are obliged to go to other mills to supply them. In order to protect themselves against such a contingency, they carry percentage profit insurance so that they will receive their regular profit just as if nothing had happened.

The following is a good form for Profit Insurance. If during the term of this policy such merchandise, or any portion thereof, shall be destroyed or damaged by fire, this company shall be liable for its pro rata share of any loss of profits and/or commissions (to be ascertained as stated below) on such merchandise which may result from such fire, which loss shall be determined by the final outcome of the adjustment of the loss on merchandise by companies insuring same, including result of any salvage handling operations, whether completed before or after such adjustment; or, if there be no insurance on said merchandise, then by such ascertainment and estimate by the parties hereto as is provided for in the printed portion of the policy.

Loss of profits and/or commissions shall be ascertained

by applying to the amount of loss on merchandise as finally adjusted the same percentage or percentages of profit and/or commissions as would have been receivable by the insured on the date of the fire from the sale of the damaged merchandise in the ordinary course of the insured's business.

It is understood and agreed that the words "the property described" and "the actual cash value" of said property in the average clause hereto attached are to be interpreted as meaning such percentage of the actual cash value of the merchandise described as the insured would be entitled to receive in commissions and/or profits upon the sale of the merchandise described.

PROFITS OF A LEASE—This class of insurance may be carried where the lessee of a building sublets the premises at a profit. The amount of insurance is determined in the following manner: Assume that a building is leased for a term of 10 years at $1,000 per year. The lessee sublets the premises at $1,500, thereby making a profit of $500 per year or $5,000 for 10 years. Should a fire occur and terminate his lease he would clearly lose the difference between the amount he pays the lessor and the rents he receives from his tenants. It is important that the fire clause of the lease be reviewed before writing the insurance. Only competent underwriters should pass on this form of insurance. See Leasehold Interest. See Value of a Lease.

PROHIBITED RISK—One of a class which has shown such an unprofitable loss ratio that a company will not write any insurance therein or thereon.

PROOF OF LOSS is the sworn statement of the insured to the insurer, setting forth the time fire occurred, the amount of loss and damage sustained, information concerning ownership, the cash value of property covered, the names of other companies interested, and the amount of their policies, the total amount of insurance carried and the occupancy of building at the time of fire. There are two forms, known as the short and long forms. The short form is used for all losses not exceeding $100, while the long form is used for larger losses. See Adjuster.

PROOF SPIRITS—See Alcohol Grain.

PROPORTION—A knowledge of proportion is a great help to a map clerk or examiner. For instance, assume a total schedule of $6,000,000 is offered with given amounts on some five different properties of which your liability is $1,500,000. The method employed is to divide the total amount of liability by the total amount of schedule and thus arrive at the percentage which you are to carry. Thus, $1,500,000 divided by $6,000,000 equals .25 or 25 per cent. To find the amount of liability on each of the different properties take 25 per cent of each item. The sum of these items will then equal the total amount of liability. Example:

Schedule		Percentage	Company's proportion
1st item.......	$2,500,000	25%	$625,000
2nd item.......	1,500,000	25%	375,000
3rd item.......	1,250,000	25%	312,500
4th item.......	500,000	25%	125,000
5th item.......	250,000	25%	62,500
Total			$1,500,000

PROPRIETARY MEDICINES (liquid or tablet form)—In manufacturing use stone and iron mills, chasers, pulverizers, dry rooms, presses for tablets. May use in the manufacture such things as nitroglycerine, carbon bisulphide, sulphuric ether, turpentine, essential oils, sulphur, potash, phosphorus, camphor, nitric, hydrochloric and glacial acetic acids, lamp-black, powdered charcoal, denatured and grain alcohol. Sometimes use portable oil or gas stoves.

PRO RATA—Used when a policy is cancelled by other than the assured (unless rewritten), in which case the premium retained by the company is figured in the pro rata proportion to the time the policy has been in force. See Short Rate. See Cancellations.

PRO RATA CLAUSE—If attached to a policy makes each item apply proportionately and specifically. The clause reads: "This policy covers pro rata of each of the above *amounts totaling $——.*"

Example: A $3,000 policy applies pro rata over, say, 3 *items, one of* $4,000, one of $2,000, one of $6,000; total $12,000.

Take 3/12 or ¼ of $4,000 is $1,000; ¼ of $2,000 is $500; one-fourth of $6,000 is $1,500, or a total of $3,000, the face of the policy.

PRO RATA LIABILITY—See Mortgage clause (full contribution).

PROSCENIUM WALL—The fire wall between the stage and auditorium of a theatre. If the curtain to this wall is of an approved material and properly hung, should fire break out on the stage the chances are that the lives of the entire audience will be saved. See Theatres.

PROTECTED RISKS—Risks under fire department protection. See Accessibility; also Topography.

PROVISION DEALERS—Work consists of meat washing and trimming, sausage meat grinding and stuffing, cooking, lard rendering and pressing, smokehouses, refrigerating, pickling, coopering. May have carpenter and paint shop, stable and garage in large plants. Those not having standard smokehouses have a poor fire record. See Smoke Houses.

PRUSSIAN BLUE—Made of sulphate of iron and yellow prussiate of soda. Chlorate of potash is used for oxidizing. See Soluble Blue.

PRUSSIC ACID (hydrocyanic)—Composed of hydrogen, carbon and nitrogen. See Hydrocyanic Acid.

PUBLIC HALLS—See Halls.

PUBLIC MARKETS—See Markets.

PUDDLING FURNACE—Used to convert cast-iron into wrought-iron.

PUDROLITE—A rock powder largely composed of saltpetre and sulphur.

PUG MILL—A mixing machine used chiefly in clay and paint factories. Used for tempering brick clay in potteries.

PULLEY STYLE—That part of a box frame which is next to the sash and contains the pulley.

PULLEYS (wood) in an elevator head may cause fire when the elevator becomes choked. Experiments prove that when a choke-up occurs, the friction of the wood pulley on a canvas or rubber belt will produce actual fire (not merely excessive heat or smoke) in from six and one-half to twenty minutes, depending principally on the kind of belt used, the size of the pulley, and the height of the elevator. Iron pul-

leys should always be used. See Strut Boards, also Elevators. See Dust Explosions.

PUMICE STONE—A volcanic product. Used as an abrasive. Considered good insurance.

PUMPING STATIONS—Usually fireproof buildings with steam or electrically-driven machinery. Open day and night. Considered excellent insurance if of latest type of construction.

PUMPS—If a pump shows 43 lbs. of pressure it is the equivalent to head of 100 feet; in other words, same as a gravity tank 100 feet elevation.

On the approach of cold weather, pumps should be tried to see if in proper working order. Examine the pump suction pipe to see if strainer is clear and free from refuse or otherwise obstructed. See Fire Pumps. See illustration, page 636.

PUNCHEON for liquors is made in three sizes—72, 84, and 120 gallons.

PUNGENT ODORS. See Tar.

PURCHASE MONEY MORTGAGE—Applied to a transaction where a party purchases a business and pays the former owner a certain amount each month. The former owner retains a mortgage until the full amount is liquidated. This transaction is considered O. K. by underwriters. The buyer is constituted the sole owner. Loss is usually made payable to the mortgagee.

PURLINS—The horizontal pieces placed on rafters for supporting the roof covering. See Piers.

PURPURINE—A red coloring matter produced from madder. Similar in many respects to alizarine.

PUSH CART STORAGE—Vendors usually store their push carts over night in cellars of buildings, yards, old sheds, stables or regular cart storage places which are usually the grade floor of a tenement or an old building. The merchandise may be left in the cart and covered with a cloth. Vendors use gasoline torches at night for lighting, and these with a supply of gasoline may be looked for. The fires in peanut roasters may be left burning and set fire to the premises if left unattended. Defective stoves with all kinds of

efuse and fuel may also be found. Premises are very untidy. Poor fire record.

PUTTING-OUT MACHINE (in leather works)—A machine which squeezes the water out of the skin.

PUTTY—Linseed oil and whiting. Mixed and heated in steam kettles with agitators. Rapid motion mills for grinding. Barrel painting, irons for soldering can tops, linseed oil storage and oily rags and floors are principal hazards. Glue putty is made from whiting and hot, melted glue.

PYRALIN—Trade name of a nitrocellulose compound, incorrectly called celluloid.

PYRENE—A secret liquefied gas, said to consist of carbon tetrachloride charged with carbonic acid gas to the point of saturation, with a small amount of ammonia gas and hydrochloric acid. It vaporizes and forms a gas blanket excluding the oxygen from the fire. Pyrene extinguishers are recommended for garages, car barns, chemical plants, calcium carbide fires, paints, oils and varnishes but not for general factories' purposes, department stores, etc.

PYRIDINE—Used for denaturing alcohol. An inflammable oil obtained from coal tar.

PYRITES—Or natural disulphide of iron. A dense, hard mineral of crystalline structure and pale yellow color. There is some doubt as to whether they are subject to spontaneous combustion, although several cases are on record of fires starting in the holds of ships where only this cargo was stored. The pyrites used in manufacturing sulphuric acid usually contain about 48 per cent of sulphur, 40 per cent of iron and the balance silica, copper and arsenic. It is burned in a kiln which is kept supplied with fresh quantities of ore.

PYRO—A prefix signifying fire. Also abbreviation for Pyrogallic Acid.

PYROBAR PARTITION BLOCKS—Are made of gypsum (plaster of Paris) and wood fibre. Hollow blocks are approved for partitions when 3 inches thick.

PYRODENE—A so-called fireproof paint.

PYROGRAPHIC OUTFIT—Consists of a bottle of benzine, a rubber tube connecting to a needle and a small bulb

which is squeezed by hand the same as an atomizer. The needle is first heated, and then the benzine vapor pumped to the needle to keep it hot while burning the wood. Flemish white wood is mostly used. These have been the cause of many fires.

PYROLIGENEOUS ACID—The crude acid obtained by the destructive distillation of wood. Has smoky odor, not inflammable.

PYROLIGNITE—A very inflammable mordant used for dyeing black goods.

PYROMANIAC—A fiend who sets buildings on fire, usually only to see them burn, or watch the fire engines run to the fire. See Incendiarism.

PYRONOME—A high explosive.

PYROPHORES—Substances glowing and igniting spontaneously.

PYROPHORIC—Self-igniting at comparatively low temperatures.

PYROPHORUS—An artificial product generally prepared from alum, honey, flour and sugar. It takes fire on exposure to the air.

PYROXANTHIN—Obtained from wood spirit. Very inflammable.

PYROXYLIC SPIRIT—Is wood spirit.

PYROXYLIN—Solutions of pyroxylin, nitrocellulose, or soluble cotton dissolved in amyl acetate or other solvents. See Celluloid.

PYROXYLOL—See Pyroxylin.

Q

QUARRIES (slate)—Hazards of large frame areas and dry lns. Moral hazard is most important. The natural supy of slate may be exhausted and render the plant useless, slate may be of poor quality which would cause a great preciation in the value of the quarry. Cost of transportion to markets may be so high that the plant cannot opere at a profit.

QUEBRACHO—An extract from wood bark, used in tanng. Will melt, but will not burn.

QUEEN POST OR QUEEN ROD—See King Post.

QUEENS METAL—An alloy of tin, antimony, bismuth d lead.

QUEENSWARE—Glazed earthenware of a cream color.

QUERCITANNIC ACID—Tannic acid of oak.

QUERCITRON—Bark of oak tree, used in tanning.

QUICKLIME—Same as caustic lime or calcium oxide. e Lime.

QUICKSILVER—Commercial name for mercury.

QUILL TOOTH PICKS—Work consists of sterilizing d repacking natural and artificial quills or straws and cov; for same. Use motor-driven machines for making covers, d gas or steam for heating water. Fair insurance risks.

QUINIC ACID—Obtained from cinchona bark.

QUINOLENE—An oily inflammable liquid.

QUOIN STONES—Stones placed along the vertical an:s of a building.

R

RABBET OR RABBITT—A groove along the edge of a board or a door frame, as for instance, fire doors of swinging type must be rabbetted.

RACING STABLES have a poor fire record. Belmont Park, Long Island, burned twice in one month in 1917. See Stables.

RACKING OFF (in breweries)—This means drawing the beer into kegs. A filling machine and liquid gas tank are used for pressure. See Breweries.

RADIANT METAL POLISH—Flash point 200 deg. F. Classed non-volatile.

RAFFIA—A grass fibre.

RAFTERS—Those timbers which form the inclined sides of a roof and carry a roof covering. Joists to which roof boards are nailed.

RAGOSINE OIL—A mineral oil. Flash, 380 deg. F.

RAG STOCKS—This business has a very poor fire record, especially where sorting or baling is done. Open gas jets over sorting tables, smoking and coal stove heat are poor features. Clean woolen rags in bales are good insurance and better than clean cotton rags. Clean rags are those received from mills (called clips) and are sorted and sold for various purposes. **Cleaned rags** are those from discarded clothing which have been cleaned and are sometimes called "street rags." Generally employ poor class of help. Serious exposure to surrounding properties. See Clippings. See Skirted Woolen Rags.

RAILROAD CAR HOUSES—A standard Railway Car Storage House should be so constructed and protected that *it may not* contribute in any manner toward the spread of *fire therein, and* contribute only, in case of fire, not to exceed

ectional losses of the structure. One single division should ot exceed dimensions to expose to any one fire a greater umber of cars therein than would represent a valuation of 200,000 of combustible rolling stock, or a total interior rackage of not more than 1,800 feet.

Floors—To be of brick, concrete, stone, cinders or earth.

Hazards—All electrical, heating, power and occupancy azards to be installed and maintained, and where necessary ɔ be cut off, to be in accordance with the rules and requireıents of the National Board of Fire Underwriters.

Pits—To have brick, stone or concrete retaining walls or iers; brick or concrete floors; steps of stone, concrete or on; the rails to be supported on brick, concrete, stone or ood stringers exposed on one side only, and to have not ıore than four-track sections communicating.

Stable Hazards are now practically nil. Electricity ɔr power and heat is the main hazard. Large areas, conruction features, untidy condition in pits between tracks, epair and paint shops, sand heaters, employees lounging and ɔilet rooms and clothing closets are also matters of imporınce for inspection. The fire record is fair.

Tracks—To run clear from building, without break or ansfer table. To be terminated by suitable bumpers, so ıat there will be a clear space of not less than three feet etween bumpers and wall of building. Special track work ı front of building to be provided with guard rails, where ecessary.

Track Doors—Track doors to be in pairs, to be arranged ɔ that whether open or closed any door of one pair will ot interfere with the operation of any other pair. When ithin 10 feet of cut-off walls, to be constructed and hung s for a standard swinging fire door. Approved metal roller oors may also be used.

RAILROADS—Protection along railroads to prevent rush or forest fires. Along railroads, fire safety strips are mployed. A strip about 25 feet on each side of the track is eared of all material. Back of this there is a strip of woods om 50 to 60 feet wide, on which the timber is left but om which all the underbrush on the ground is removed.

Beyond this wooded strip is a ditch from 5 to 6 feet w
and a foot or more deep. The dirt from the ditch is thr
back toward the railroad and forms a small embankm
Cross ditches are dug through the wooded strip about
yards apart. After the material on the ground is cle
each year there is nothing else to be done and it is sel
that a fire escapes. By this device, and by strict enfo
ment of laws governing the use of spark arresters, etc.,
number of fires started by railroads is kept down to a
prisingly small total. See Forest Fires.

RAILROAD TERMINALS—Usually large area of fr
construction. Should have plenty of fire pails and ex
guishers and a good standpipe system. In unheated p
tions, the water in standpipes is apt to freeze. Oftenti
the standpipes are drained at the beginning of winter a
supply must then be turned on in engine-room or pumpi
station, in case there is a fire. In transporting perisha
freight, such as potatoes, in box cars during cold weath
there is grave danger of freezing. Instances are kno
where the burlap and straw covering was deemed insuffici
and a coal fire built in the car, with the result that the c
and the freight were destroyed. A poor fire record class.

RAINES LAW HOTELS—Hotels only in the eye of t
law as the furnished rooms above the saloon are seldom,
ever, used.

RAIN-LOOP—A loop made in electric wiring just befo
it enters the wall of a building, to prevent rain from flowi
in.

RAISING PLATE—See Wall Plate.

RAMIE—A fibre from an oriental plant of the nettle fa
ily, used instead of cotton for braids, trimmings, napery, e
Similar in appearance to thrown silk and woven the sa
as straw braid in a straw hat factory, on a "ramie" machi
then sized with glue or starch, dried over steam coils a
smoothed in steam or gas-heated calender.

RANDANITE—An absorbent for dynamite; is a silic
material.

RANDOM STONES—Stones thrown into the water
form a foundation or retainer wall.

RANGES (large) should have a hood to confine, and ven-
ıting duct to carry off grease-laden vapors or smoke. A
n draws the vapors to a stack or flue. These hoods and
nts become coated on the inside with grease, which takes
e from the stove. Steam jets are sometimes installed un-
r hood so that if grease is ignited steam can be turned on
smother the fire. See Gas Ranges.

Ranges (small)—Should be set on one course of brick on
eet-iron. Large ranges should be set on fireproof floors.
the floors are combustible, ranges must be set on a foun-
tion consisting of two courses of four-inch terra cotta
three courses of brick, top course pigeon-holed, on metal.
oundation to extend 12 inches in front (except if solid fuel
used, in which case 24 inches are required), also 12 inches
des and rear. If ranges have four-inch legs, only one
urse of terra cotta needed. If 18-inch clear space from
mbustible material only a metal shield is required. See
as Ranges. See Illustration, page 544.

RAPE OIL—An oil resembling olive oil, but pressed from
pe seed. Flash, 440 to 580 deg. F. Used at altars in
urches.

RATE OF TEMPERATURE RISE DEVICE—See Auto-
atic Door Release.

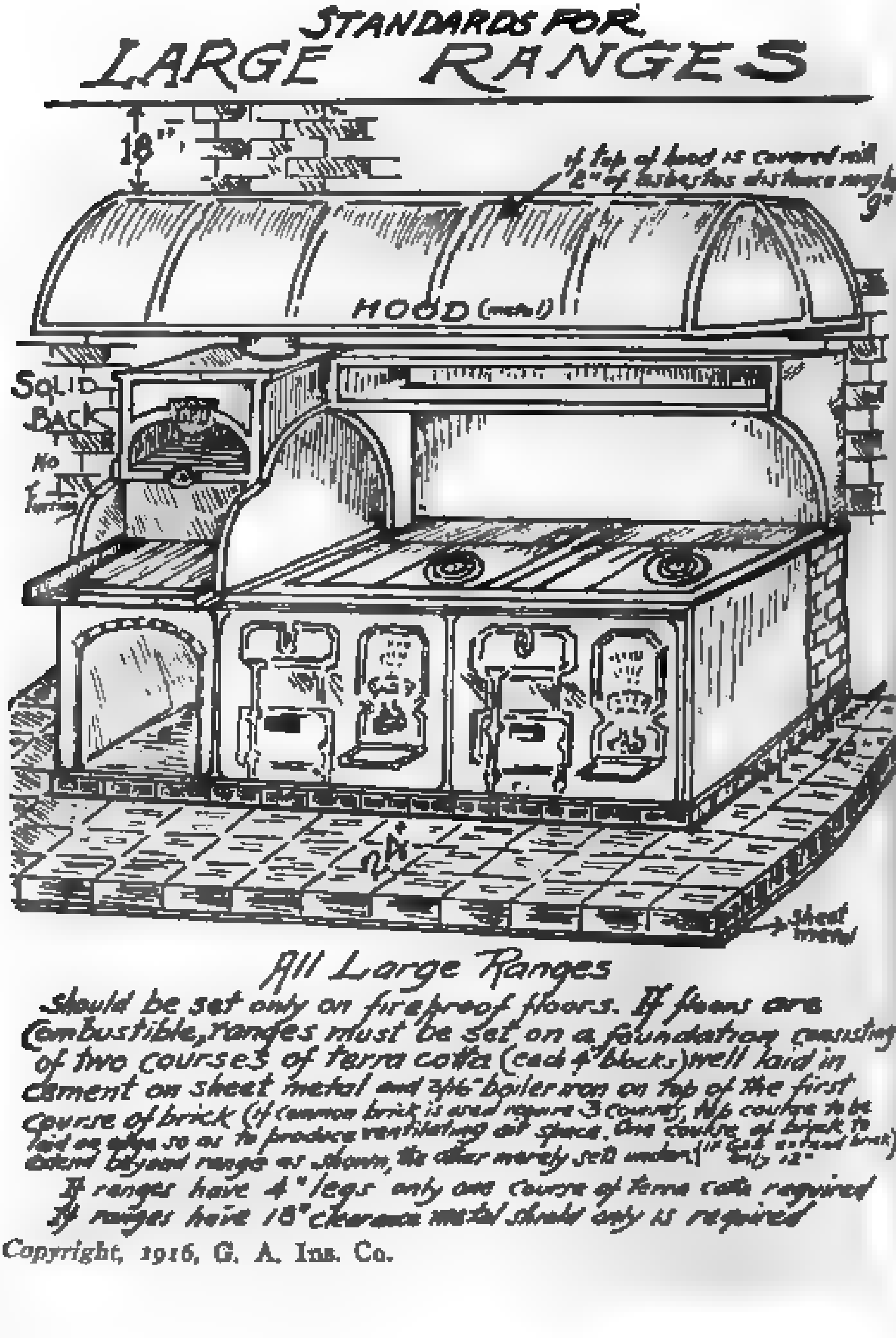
**RATES—The object sought in fixing fire insurance rates
New York City.**—By W. O. Robb.

1. To provide such a premium income from the aggregate
f fire underwriting operations in the metropolitan district
s will in average years be sufficient to pay the losses in-
urred in that district plus the specific expense and a pro
ata share of the general expense of doing business, and yet
ave margin enough both to pay a fair profit on the capital
nd surplus invested and to provide for the accumulation of
reserve against extraordinary or conflagration losses not
ccurring in average years and not to be treated as exclu-
ively a metropolitan district contingency.

2. To so apportion this levy, or insurance tax, among the
arious classes of risks as to make each class come as near
s possible to the payment of its own losses and the contri-

bution of its proper proportion toward the expense, profit and reserve accounts.

3. So to distinguish among individual risks of the same class that proper credit will be given or proper charge made



for all variations above or below the standard of the average risk of the class, according to best judgment of underwriters and the fire protection experts; that every property owner can be made to see just what it is that operates, and how far it operates, to make his insurance cost more or less than his neighbor's in the same business, so that the suspicion as well as the actual practice of unfair discrimination may be removed, and that every proper kind of pressure and inducement may be brought to bear in the direction of the improvement of the fire hazard and the reduction of the fire waste. See Schedules.

RAT POISON—The stock may contain phosphorus, arsenic, etc. Many fires have been started where these stocks have been stored. An "accommodation" class.

RATS, FIRES CAUSED BY—The following is quoted from a bulletin of the United States Biological Survey:

It is generally believed that rats and mice cause fires by igniting matches with their teeth. The testimony of chiefs of fire departments and adjusters of fire insurance claims confirms this belief, and many specific instances have been given of fires caused in this way. A fire, which resulted in the partial destruction of the Sultan's palace at Scutari, Asia Minor, in 1856, had such an origin. During 1907 the fire department of Washington, D. C., gave a similar explanation of a fire which seriously damaged a large store and its contents.

Manufacturers of matches often dip them in paraffine to protect the phosphorus. The paraffine is attractive to rats and mice, and the matches are often carried under floors and behind partitions, where they are subsequently gnawed. Paper and other combustible materials collected by the animals add to the danger of fires. Moreover, since the heads of phosphorus matches contain from 14 to 17 per cent of phosphorus, it does not require actual gnawing by rats to ignite them. Hot weather, excessive heat from furnaces, or friction of any kind may effect the same result as the teeth of rats, when the matches have been carried into a nest made of combustibles.

Fires in mills and warehouses have been traced to the

spontaneous ignition of oily and fatty rags or waste carried under floors by rats or mice. Cotton mills are said to be peculiarly subject to fires from this cause.

Phillip's Warehouse, Church Street, London, was twice set on fire and damaged by reason of gas leaks. In both instances the lead gas pipe leading to the meter had been eaten through by rats, and the escaping gas was accidentally set on fire by workmen who were searching for a leak. In a similar instance of gas leak caused by rats in a London private residence, no fire resulted, but a sleeping family of four persons narrowly escaped death by asphyxiation. An inspector in the employ of the Washington Gas Light Company recounts a similar instance in that city where pipes were gnawed by rats, but fortunately it occurred when the inmates were awake.

The most common way in which rats cause fire is by gnawing away the insulating covering from wires used in electric lighting, where the wires pass under floors or inside of partitions. The insulating materials are used for nests, which rats often build of combustibles placed in contact with the naked wires. Insurance companies, a few years ago, estimated the fire loss of the United States due to defective insulation of wires at $15,000,000 yearly; and since rats and mice are the chief agents in impairing the insulation after the wires are in place, a large part of the above sum must be charged to these animals.

RAW RUBBER—See Rubber, Crude.

RAW SILK—See Silk, Raw.

RAZOR STROPS—After being tanned, dressed and sandpapered they are cut into strips, then oiled with tallow, neatsfoot oil or soap dressing, and then embossed with a trade mark. Wooden handles may also be made on the premises. The oil dressing is a mixture of mineral and vegetable oils. See Leather.

REAR BUILDINGS—Generally unattractive as they cannot be seen from street, and they receive less attention as to repairs than front buildings. If vacant, they are apt to be the rendezvous for tramps. When on fire are more difficult to extinguish on account of inaccessibility.

REAR YARDS which are untidy with rubbish, old boxes, etc., have been the cause of many fires. They should be kept clean. See Vacant Lots.

RECEIVING STATIONS are depots where customers' goods are received to be sent away to factories for dyeing, laundering, etc. Usually good risks if only minor repairs are made on the premises. (E. Hirsch.)

RECIPROCATING MOTION—The opposite of revolving motion.

RECONDITION—Oftentimes after a fire loss the adjuster will order the partly damaged goods removed to another location so that the stock may be quickly and properly sorted and reconditioned.

RECORDS—On wooden racks, tier upon tier, offer no resistance to fire and the dried-out bindings and paper conduce to the rapid spread of a fire. Government archives with records of surveys, and similar records of private firms are irreplaceable, when once destroyed. Heads of institutions show a marked lack of thoroughness in leaving such records exposed to the fire fiend. See Patterns.

RECORDS (Phonograph)—See Phonograph.

RECTIFICATION is more hazardous than ordinary distillation as the gas and spirits formed are more volatile.

RECTIFYING—A cold process by which the "proof" of the liquor (percentage of alcohol contained therein) is either raised or lowered. Water is used to reduce, and additional alcohol to raise the proof. Commercial alcohol is about 90 proof. Aside from the handling of alcohol, there is no hazard to this process. See Liquors and Distilleries.

RED CHROME is bichromate of potash.

REDISTILLATION—Is rectification.

RED LEAD—An oxide of lead. In its making, special furnaces are required. The cuppellation furnace converts metallic lead into litharge. The reverberatory furnace or oven reduces metallic lead into litharge. See Candle Factories.

RED LIQUOR—Solution of either aluminum or sulphate acetates.

RED OIL—Also called Elaic or Oleic acid. This oil may

be subject to impurities (and therefore cause spontaneous combustion) if the sulphuric acid used in the process of candle making (red oil being used as a subsidiary product) is not entirely removed. See Candle Factories.

RED OXIDE OF ZINC—See Zincite.

RED PHOSPHORUS—See Phosphorus.

RED-SANDERS WOOD—An East Indian wood used in dyeing.

REDUCTION—A process carried on by treating the compound to be reduced with powdered metal, the purpose being to abstract a certain amount of oxygen by forcing it into combination with the reducing element.

RED VITRIOL—Is sulphate of iron.

REDWOOD—Although a soft wood offers considerable resistance to fire; is very slow to ignite and will not burn except under the most favorable condition. Used for outside walls of frame buildings in the western part of the United States. Classed as soft wood.

REED AND RATTAN—See Cane and Rattan Works.

REFINERS AND SMELTERS OF METALS—Furnaces, kettles, pits, etc., should be carefully inspected as to setting and clearance. Usually occupy ramshackle properties. Poor fire record. Usually total loss fire risks. See Sweep Smelters.

REFINERY—A place where some crude material, such as sugar, petroleum, etc., is purified.

REFINING—See Liquors.

REFRIGERATION—There are two systems of producing artificial refrigeration in common use at the present time, in both of which the use of volatile liquids is necessary. They are commercially known as the "compression" and "absorption" systems, named in order of their popularity. In the compression system, ammonia and carbon dioxide are commonly used, the former being the more dangerous from nearly all points of view.

The **compression system** is divided into three parts, namely, the compressor, the condenser and the expansion sections. The compressor draws the expanded or heated gas from the expansion coils, compresses and forces it under

pressure through the condenser coils (coils of pipe cooled by running water), where the gas is again reduced to a liquid and conducted to the expansion coils which it enters through an expansion valve (usually a needle valve). The expansion coils are iron pipes in which the volatile boils or vaporizes. Volatiles in use require a great deal of heat to vaporize. This heat is taken from the surroundings of the expansion coils. As the gas becomes heated it is again withdrawn by the compressor and forced through the same cycle of operation as before.

The **absorption system** is not as hazardous as the compression system inasmuch as no mechanical energy is necessary except a small pump used in forcing the solutions from one part of the system to another. Volatile gases will not condense at the temperature produced by the running water at the condenser unless they are under pressure. In the compression system, the pressure is maintained by the compressor. In the absorption system, the pressure is maintained by boiling. A solution of aqua ammonia is placed in a boiler (usually steam-heated). The ammonia having much the lower boiling point is promptly vaporized at a pressure sufficient for condensation and is conducted through various sections (purifying and separating), until it reaches the condensers, where it returns to liquid form and is conducted to the expansion coils (refrigerator) as in the compression system.

After the gas has done its frigorific work, it is conducted to a chamber in which it is mixed with and finally absorbed by water, the mixture returning to the boiler or generator where it undergoes the process of distillation as before. The expansion coils are sometimes used in direct refrigeration, i. e., the volatile is allowed to expand in coils of pipes in the refrigerator, usually located at the sides or top. Where high temperatures are desired, however, the expansion coils are immersed in tanks containing a rich brine, which is cooled by the expansion of the volatile, and forced through pipes in the refrigerator.

Hazards—Boiler and engine-room hazards usually exist in connection with refrigeration plants, and the inherent haz-

ards should be properly guarded. In addition there are severe incidental refrigeration hazards, especially where ammonia is used. Ammonia forms explosive mixtures with lubricating oils in the compressor. In order that this hazard be confined to the least possible space, oil traps are placed in the pipe line between the compressor and condenser, designed to remove the oil from the gas. No open lights should be allowed in engine room. No ammonia cylinders (filled) should be kept on the premises except in room at low temperature. Good risks. The fire record is very good.

Fire Department Connections are now required in New York City for plants above a certain tonnage capacity. A connection is made between by-pass connected with safety valve and sewer. The connection is provided so that water may be injected to absorb and cool ammonia, and neutralize the inflammable gas, if any be present.—(W. J. Tallamy.) See Bunker Rooms; see Cold Storage.

REFRIGERATION (iceless) in the home. The refrigerator is made on the principle of the "ammonia absorption" system. The machine has a combined absorber, generator or still, condenser and receiver. Into the generator (which is heated by artificial means) is placed a mixture of ammonia and water. The heat distills the ammonia, which passes through a water jacket pipe to the condenser and cooler, and passes on in the form of anhydrous ammonia to the receiver. The ammonia vapor in the receiver takes up considerable latent heat, and the receiver becomes intensely cold, cooling the surroundings. The process is repeated automatically by cooling of the generator by means of a water jacket, which creates a vacuum in the generator, and the vaporized ammonia rushes from the receiver back to the generator. A small apparatus.

REFRIGERATING PLANT FIRE—Fire was caused by ignition of waste paper, etc., and generated an intense heat which melted the lead joints in the condenser, releasing the ammonia gas. This gas (probably foul gas), composed largely of hydrogen, due to the disassociation of ammonia gases under heat from pressure, ignited and burned like

huge blow-torches under heavy pressure. After the inflammable foul gases had been expelled from the piping, pure ammonia vapor undoubtedly issued and probably aided in smothering the fire. It is recommended that all rooms containing refrigerating apparatus be cut off from the balance of plant by fireproof partition, with approved automatic fire doors at the openings.

REGULATING RHEOSTATS are boxes containing resistance coils. They are attached to the motor generators and can be adjusted to give any resistance desired. The speed of machines can be thus varied at will and their voltage thus controlled.

REINFORCED CONCRETE—See Concrete.

REINFORCED CONCRETE STANDPIPE—These standpipes for the holding of City Water Supply are reinforced concrete construction, except Guastavino Arch roof and their advantage over steel construction is that they are usually less in cost with no cost for maintenance and apparently no limit to its life. See Steel Standpipe.

REINSURANCE—Oftentimes a company will write a larger policy on a risk than the "line sheet" calls for, to accommodate a broker or an assured, who desires policies for large amounts. To reduce its net liability, the company then places part of its line in another company. A re-insuring company may require "a retainer clause" to be put on its policy, especially on poor risks, which, in brief, states that the company holding the original policy and reinsuring agrees to retain as much liability as it is reinsuring.

Reinsurance (Parties)—This form of reinsurance is used when one Company or Companies reinsures another against loss on contents of a storage store or warehouse. The reinsuring companies are ceded a certain portion of the insured company's gross liability and each Company is liable for its proportion of each and every line according as its amount bears to the total amount of insurance, excepting any item on which there may be specific reinsurance.

The use of this reinsurance eliminates the necessity of reinsuring *each item* separately (which would otherwise be

necessary) to keep within the required net authorization. See Liability; see Placer.

RELC STATIONARY CHEMICAL ENGINE—Is similar to that of the chemical engine of the public fire department and it uses the same chemical solution. Each engine is connected with a standpipe having hose connections on every floor. The apparatus is practically the same as the Sypho-Chemical System except hose is used instead of sprinkler heads, but installations can be used employing sprinkler heads. The engine is made in sizes of 100, 200 and 250 gallons capacity and can be used in buildings as high as 60 feet. The equipment reduces insurance rates 10 to 15 per cent in some territories. See Sypho-Chemical.

RE-LYT—A water-proofing compound used in shoe factories for softening leather. Made of oils and greases. No thinner required. Flash about 350 deg. F. Classed non-inflammable and non-hazardous.

REMOTE RISKS should be written with extreme care. The one fact of being in territory not readily accessible for inspection is enough to satisfy the company that low liability should be assumed. See Accessibility.

REMOVALS—A policy may be written pro rata to cover the present and new locations for a period of 10 days or a privilege may even be given without limit of time. In case of fire, the standard policy allows a period of five days at each location, to which any of the property shall necessarily be removed to prevent further damage. (T. B. Robertson.)

RENDERING FATS AND GREASE—The entire interior of the plant is usually grease-soaked and burns rapidly. The tankage, or solid matter left after rendering, is pressed into blocks and used as fertilizer. Fierce Burners. Unprofitable insurance as a class. See Fat Rendering.

RENDROCK—A form of dynamite.

RENEWAL—A policy continued in force at the expiration of the original contract by the issuance of a "renewal receipt" or by issuing a new policy under the same conditions as the original, to take effect as the old policy expires.

RENT INSURANCE—Insurance to protect the assured *(owner of property)* in case the building or any part thereof,

on account of fire, is rendered untenantable and the rent loss is actually sustained. Underwriters consider rent insurance excellent and usually write twice the authorized building line on the theory that not over a six months period will elapse before the premises can be restored to their former state. The experience in writing this class of insurance is very good, as most buildings can be restored in one or two months. The following form is used on straight rent insurance and does not cover unoccupied portions. Form reads:

The intention of this insurance is to make good the loss of rents, caused by fire or lightning, actually sustained by the assured on **occupied or rented portions** of the premises which have become untenantable for and during such time as may be necessary to restore the premises to the same tenantable condition as before the fire; said time, in case of disagreement, to be determined by appraisement in the manner provided in the conditions of this policy; but this Company shall not be liable for a greater proportion of any loss than the sum hereby insured bears to the actual annual rental of the entire **occupied or rented portions** of the premises. (See Rental Value.)

RENTAL VALUE—This form of rent insurance guarantees payment if the building or any part thereof is destroyed by fire and rendered untenantable **whether or not occupied by either owner or tenant at the time of fire.** Considered good insurance. The following form is used:

The intention of this insurance is to make good the loss of rents, or rental value, caused by fire or lightning, actually sustained by the assured on portions of the premises which have become untenantable whether **occupied or vacant** at the time of said fire, for and during such time as may be necessary to restore the premises to the same tenantable condition as before the fire; such time, in case of disagreement, to be determined by appraisement in the manner provided in the conditions of this policy; but this Company shall not be liable for a greater proportion of any loss than the sum hereby insured bears to the annual rents, or rental value of the entire premises.

When necessary, this self-explanatory clause is added: "It

is agreed that the assured hereunder are sub-tenants of the above described building and that they are obliged under the conditions of their lease to pay rentals irrespective as to whether the building is damaged or destroyed by fire."

It is advisable to ascertain if the building is tenantable. If it is vacant and untenantable and insured under the rental value form, there may be some inducement to the owner to burn and thus collect the rental insurance. See Rent Insurance.

RENTS AND LEASEHOLDS—Sums derivable from real property, which are lost by the assured if a fire interrupts the continuous enjoyment of the property. As to the tenant under lease, a fire means the destruction or impairment of the property right for which he has paid or is obligated to pay.

REPELLO—Waterproof compound used in shoe factories, not volatile or inflammable. It may be used inside of building without danger.

REPORTING POLICIES—The type of policies we are referring to has received different names, the latest being "Declaration or Adjustable Policies," but the object in all cases is apparently the same. It was recently stated in an English paper: "Roughly, the declaration policy is a policy for a provisional sum insured at a provisional premium payable in advance. The actual sum insured at a given moment is the value of the property covered at that moment, but not exceeding the provisional sum insured. Declarations of value are required to be furnished by the insured at stated intervals, and the actual premium chargeable is based on the values so declared. "This kind of a policy was considered as the coming thing a few years ago, but, as a matter of fact, it has not developed as its sponsors expected; on the other hand it has been used very little. It has, however, recently been revived, and probably if it is to have any life at all it will be heard of a great deal now that the war is over. Insurance people, like the rest, have been so busy with so many matters during the war and even now that it has not been possible to develop new forms and new methods. *From the fact,* however, that this form of policy originated

in peace times and had not gained a very large hearing, it may prove to be one of those things that promise well but will fade out in actual practice." (Spectator, Nov. 21, 1918.)

RESERVE of an insuranec company is based upon the amount of unearned premiums of policies in force. States require a definite percentage of all premiums to be set aside by the company, the amount ranging from 40 to 100 per cent. It is for the protection of outstanding policy holders.

RESIDENCE SECTIONS—Usually deteriorate when changing from one class of people to another less desirable class. Values depreciate especially near the border of a growing "colony" section. Very important to watch the growth and changes in all sections of a large city.

RESIDENT BUYER—One who buys from manufacturers or wholesalers for other concerns. He receives goods for examination and acts as a buying agent. Stock therefore is only on trust, belonging to the manufacturer who ships same, or to the consignee.

RESIN—See Rosin.

RESINATE (precipitated) of zinc. If moist may ignite spontaneously. The New York Board of Underwriters excludes this from listed storage stores. A quantity recently ignited spontaneously in a Newark warehouse.

RESINITE—A new substance useful as a substitute for ivory or celluloid. It renders wood or paper impervious to water.

RESIN OIL—Distilled from resin.

RESISTO—A water-proofing compound for sole leather usually found in shoe factories. No thinner is required. Flash 400 deg. F. Not inflammable.

RESPONSIBILITY FOR FIRES—Under the Code Napoleon in France, a man is held responsible for fire damage to his neighbor. Each fire is investigated and the owner or tenant of any premises must show he is not responsible for a fire starting in any premises occupied or owned by him. In France a tenant usually insures by one policy the following items. (1) His own property; (2) The risk of responsibility for damage to the building; (3) The risk of *responsibility for* damage to his neighbors. A landlord in-

sures in one policy the following items: (1) His own property; (2) His responsibility for damage to the property of tenants; (3) His responsibility for damage to the property of neighbors.

RESTAURANTS—Kitchens in hands of careless people are apt to become very greasy. Bread is frequently dried in a wood box on shelf over range, under hood. Many fires start in grease laden ventilating shaft under range hood. Good insurance if well managed and hazards safeguarded. See Ranges, also Hotels and Chinese Restaurants.

RETAIL BUSINESS has been said to embrace everything good, bad and indifferent. It is this class which requires careful scrutinizing both by inspectors and underwriters.

RETAIL STOCKS—Considerable value is under counters and subject to water damage in case of fires. Those in wardrobes are better protected if top is watertight to prevent staining or streaking of goods from water. Write this class cautiously. See Second-hand Stocks. See Stocks.

RETAINING WALL—A wall which retains adjoining earth or other material producing lateral thrust.

RETENE—A highly inflammable hydrocarbon.

RETURN FLUE BOILER—A fire tube boiler in which the heat and fire gases after passing under the boiler in one direction turn in the other direction and pass through the flues or tubes.

REVETMENT—A retaining wall.

RHEA—A species of nettle, the stalks of which contain fibre.

RHEOSTAT—An electrical device for introducing and cutting out resistance. They are boxes containing resistance coils. They are often attached to the motor generators and can be adjusted to give any resistance desired. The speed of machines can be thus varied at will and their voltage thus controlled.

RHEXITE—A sort of dynamite.

RHIGOLENE OR SHERWOOD OIL—See Petroleum.

RIBBONS—Usually rolled in paper strips on a pasteboard centre. This method gives considerable protection from water, smoke and dirt. If dried quickly, the salvage

should be large. If this stock is laid sidewise on racks instead of on ends, the salvage will be greater. See Sizing Silk Ribbons.

RIBBONS (manufacturing)—Consists of weaving, braiding, tubing, singeing, yarn preparing, curling, gilling (combing and straightening.) Good insurance risks.

RICE, if wet and left in bags will mildew and be unfit for food.

RICE MILLS—Classed as a cereal mill but with less hazard. Process is cleaning, separating, removing the outer shell (shelling), hulling, separating bran, "pearling", or scouring, drying bran, grinding in iron attrition machine at high speed, and polishing. Hazards are overheated bearings, steam dry-rooms, friction and dust at attrition mills and polishing. Elevator legs, spouts and hoppers set through floors conduce to rapid spread of fire.

"RICHARDSON" door consists of an asbestos lined wooden core, metal clad, having depressed panels. The wooden core is built of pine boards, the centre layer consisting of ¾-inch boards laid crosswise. The stiles and cross rails are formed by ½-inch strips nailed to each side of the centre layer, the strips being laid to the form and size of the door and panels. The built up core is finished to exact size on a shaper, which also forms a ⅞ x ¼-inch groove in all edges. The core is nailed from both sides and is covered with thin sheets of asbestos paper. Each side is covered by a single sheet of No. 26 gauge steel, the panels being formed by hydraulic pressure. A 1½-inch flange is also turned up on all sides of the sheet in this process. The inside of the sheet is given a coat of cement and the covering applied to the core under pressure. The flanges of the two sheets lap each other at the edges and are driven into the groove and held by a continuous steel band ⅞ inch wide and 3-32 inch thick, fastened by two inch screws spaced 6 inches apart. The edges of the sheets are nailed down by 1-inch wire nails spaced 2 to 3 inches apart. The screws and nails at the edges serve to lock both sheets together.

The finished door is 1⅞ inches in thickness at the stiles

and cross rails and about ⅞ inch at the panels. A good door for stairways and other shafts.

RIDER on a policy is an endorsement.

RIDGE OF A ROOF—The peak or sharp edge along its very top.

RIDGE POLE (ridge piece or ridge plate)—The highest horizontal timber in a roof extending across the tops of the rafters of the truss.

RIDGE ROLL—The roll along the ridge of the roof and on the peaks of dormer windows.

RIDING ACADEMIES—See Stables.

RIGHT AND INTEREST OF PAWNBROKER—It is the money which the pawnbroker advances on goods pledged or pawned, together with the interest accrued. The form covering right and interest of the assured in the articles and stock of merchandise in fireproof safes is considered good insurance. See Pawnbroker.

RING ICE FORMATION—A condition sometimes found in sprinklered refrigeration plants. It is the formation of ice inside of the pipes due to condensation of moisture in the compressed air. See Ice Formation.

RIOT, STRIKE AND CIVIL COMMOTION INSURANCE—This form of insurance is written in conjunction with explosion insurance, principally to indemnify owners of manufacturing establishments against loss by riot, insurrection and civil commotion including strikes. See Explosion Insurance. See Hazards not covered by the policy.

RIP-RAP—See Random Stones.

RIP-SAW—A kind of circular saw.

RISERS—See Dead Risers; also Live Risers.

RISK—In insurance literature the term "risk" is a term applied to any piece or kind of property which an insurance policy may cover. A "risk," therefore, is any article or commodity or building which is liable to be damaged or destroyed by fire, which liability or danger the insurance company assumes for a stated price, called "the premium." (Fire Facts, issued by Washington Surveying and Rating *Bureau.*) See Occupancy; also Hazard.

RISKS declined by other companies should only be ac-

:epted after careful investigation. Usually the other com-
›any had a very good reason for declining. See Full Risk; ılso Prohibited Risk.

ROAD HOUSES—Usually conduct a season business. Most of them are of light frame construction and located n open country subjected to high winds. They may be left ınguarded part of the year. Moral hazard should be investi-gated. Fire record of this class is very poor.

ROASTING is accomplished in high temperature kilns or ›vens. See Kilning.

ROCHING CASKS—Are crystallizing vessels in alum works.

ROCK OIL—A mineral naphtha. See Petroleum.

ROCK SHAFT—One that rocks or only makes part of a revolution each way.

ROD PIN AND DOWELL MACHINE—Small machine resembling a lathe. Ordinarily consists of a cutter-head and chuck mounted in line with the pulley driving them, the stock passing through the axis of both. Considerable refuse s made.

ROENTGEN RAYS—See X-Rays.

ROLLED PAPER—See Paper (in rolls).

ROLLING MILL—A heavy machine having a set of revolving rollers through which white-hot slabs of metal are passed. The rollers reduce and elongate the metal. For producing bars, the rollers have tapering grooves, dimin-ishing in size until at the furthest end, the groove is the size of the required bar. Good insurance risks.

ROLLING STOCK—The cars, locomotives and all other equipment on wheels of a railway. It is this feature of a "railway insurance schedule" which perplexes the average underwriter as the location of this liability is seldom posi-tively known. See Railroads.

ROOF (French)—A form of roof, with almost vertical sides, sometimes concave or even convex, and the top usually flat or sloping toward the rear. The sides are pierced with dormer or other windows. The term is also applied to roofs of buildings which may have such roof construction only in *front or on one* side or both sides.

ROOF GARDENS—Some are enclosed and conform to the construction of the building on which they are located, while others are open and may be built of wood. In cities, they are places of amusement such as theatres, cabarets, drinking and smoking resorts. In the case of theatres, the stage is sometimes constructed of wood, and the electric wiring poorly installed. Rules governing theatres should be adhered to. See Sun Parlors.

ROOF HOUSE—Any enclosed structure on a roof.

ROOF LATHS—Narrow strips, laid on rafter and to which the shingles are nailed.

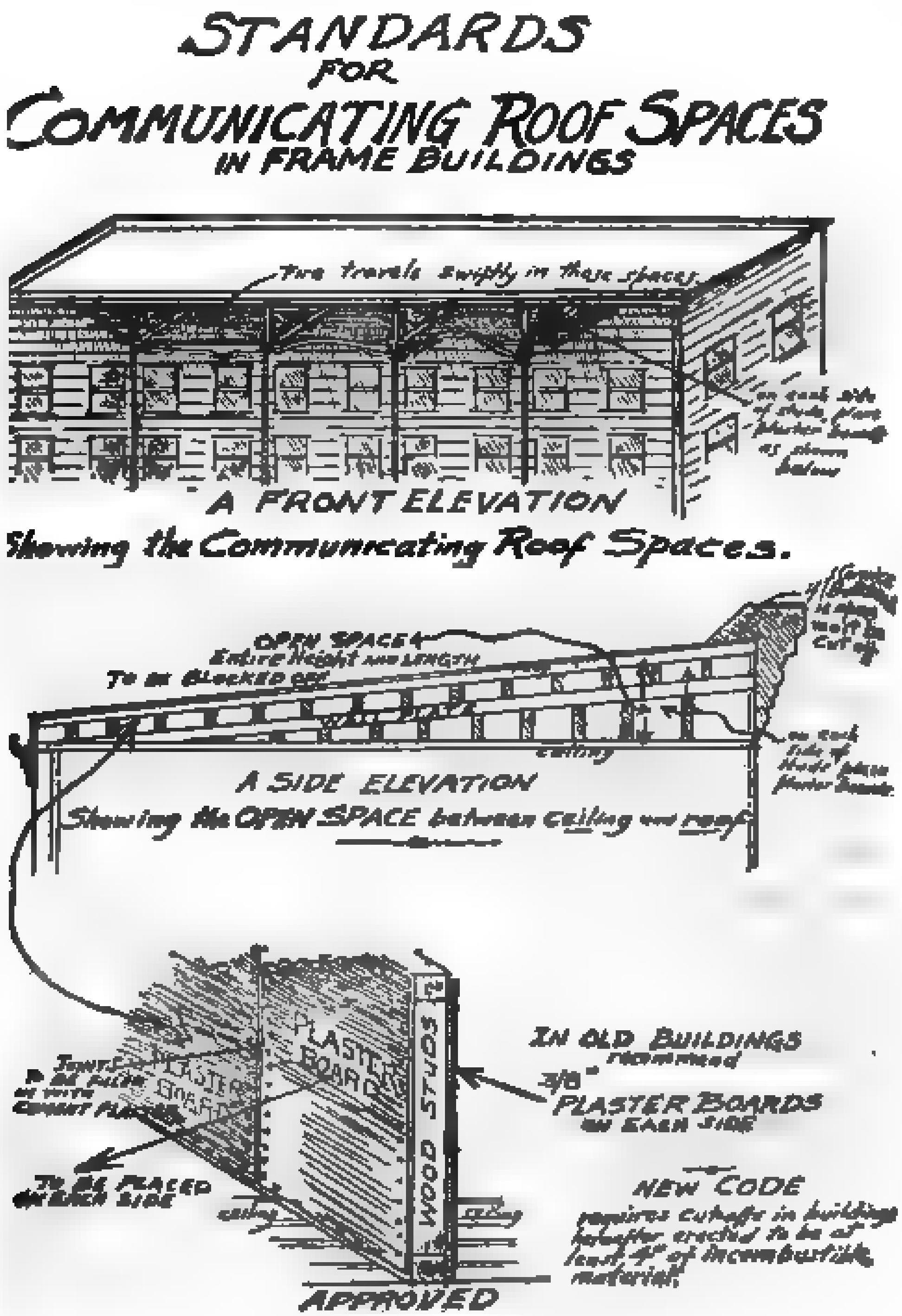
ROOF SPACES—The space between the top floor ceiling and roof. They are usually accessible from the scuttle opening leading to the roof and may be used for storage purposes. The openings leading from scuttle to roof space should be closed in with one-inch boards or trapped at ceiling. In frame rows, roof spaces between buildings must be cut off by incombustible partitions. Usually, unless the party walls are brick filled to the lower part of the roof boards, plaster boards are nailed each side of the studs, the joints filled with cement plaster. Should be kept clean of rubbish or old furniture, as the dry, unprotected wood is easily ignited and the fire flashes quickly over the surface. In dwellings, usually the dumping place for all kinds of trash. Many disastrous fires have spread through these concealed spaces, and firemen experience difficulty getting at the seat of the fire. The fire record where these open roof spaces abound is very poor. No less than a dozen frame rows with these defective features have burned nearly to the ground in the past two years in Greater New York. See Frame Rows. See illustration, page 561.

ROOFING—A five-ply composition roof properly laid is considered the equal of a metal roof by some rating bureaus.

ROOFING CEMENT—Consists of pitch, tar or asphalt with inflammable solvents.

ROOFING MOPS—Those dipped in asphaltum or coal tar and left to dry or drain may ignite spontaneously. Used in making tar and gravel roofs. Should be removed from *the building* when not in use.

OPE MANUFACTURING—The fibres used are hemp, and coir. Machinery consists of tearing machines ils) which break up the long tow ready for treatment in breakers, finishers and carding machines; the hemp soft-



ening machines, which reduce the harshness of the fibre by the crushing action of the fluted surface of the rolls; the spreading or preparing machines, called "chain drawer" which dress the hemp fibres, parallelizing them and forming them into "sliver." At the back end of this machine there is a tank containing an emulsion of oil and water used as a lubricant for the fibre under treatment. The drawing frame machine is a fibre dressing machine somewhat similar to the chain drawer, but used for the more refined finishing process of dressing. Considerable lint is made at all machines. Careful firms employ men to constantly sweep up and clean the machines.

ROSANILINE is an aniline dye.

ROSETTES—Circular or ornamental fixtures from which drop cords for electrical lamps are suspended.

ROSIN—Common resin or rosin is obtained as a residuum in the distillation of oil of turpentine. It burns rapidly with dense yellow sooty flame. Inflammable.

ROSIN OIL is distilled from rosin. It is a light oil of same inflammability as turpentine. Used as a turpentine substitute.

ROTARY CONVERTER—An apparatus for changing alternating currents into direct currents.

ROT-STEEP—An alkaline lye used to remove the sizing on calico cloth before it is printed.

ROTTEN-STONE—An earthy mineral used in hand rubbing and finishing furniture.

ROUTING is grooving out.

ROVING—Forming the rove (slub) or slightly twisted thread from the "sliver" or roll of wool, on small bobbins for the creels of the spinner. The machine is called a roving-frame.

ROYAL SPIRITS—Not approved by underwriters as a benzine substitute.

RUBBER BALLOONS AND TOYS—Rubber is mixed with naphtha in power mixers and put in open dip tanks. Wood forms, previously shellacked, are dipped in this rubber solution until coated, and then dried by hot air. When dry the thin rubber skin is stripped from the form, cured in bath of bisulphide of carbon, chloride of sulphur and

alcanin paste, powdered with soapstone and packed. Water colors and lamp-black are used for coloring. A poor fire record class.

RUBBER CEMENT—A heavy solution of rubber in gasoline, naphtha or carbon bisulphide. Inflammable. In factories underwriters permit only two quarts for each floor, same to be kept in safety pots and thinned with carbon tetrachloride. If a greater quantity is required, the excess must be stored outside of building.

Non-evaporating rubber cement can.

RUBBER, Crude—Considered desirable insurance, as it has very little fire hazard. It is apt to deteriorate from heat if piled closely, therefore it should be piled loosely in a cool place such as a basement. It is received in this country in large chunks called "biscuits." It shrinks greatly in transit, and the loss is made up by covering the rubber with sulphur, rosin and turpentine after it reaches the warehouse. The rubber absorbs this mixture and the loss is made up in a few weeks. There is some danger of rubber igniting when treated in this manner. Imported and exported in *boxes.*

RUBBER (imitation)—As used for parts of electrical apparatus, telephone receivers and transmitters and for insulating. Made of crude shellac, ground mica, terra alba (or infusorial earth), ground asbestos and tar oil. These are all placed in a steam heated mixer and reduced to a pliable pulp, then rolled into sheet or block form, or placed in hydraulic presses containing steel moulds. From presses they are cooled by natural air, then passed to cutting, trimming and buffing machines. No benzine or cement is used. Hazards are mixing, rolling, pressing, buffing, packing, trimming. The material is worked on machines for ordinary use.

RUBBER (old)—Rubber or old metals are considered desirable insurance by themselves; but in connection with rag or paper stock are poor risks. A severe (four alarm) fire occurred on Feb. 9, 1919, in Bronx Borough, New York City, and burned and smoldered for 5 days. The building was an ordinary brick 5 story with a brick elevator shaft having fair metal clad doors at all openings. The fire started on 1st floor near front of building, and burned through about one-third of 2nd floor which collapsed. The fire skipped the 3rd floor, but entered the elevator shaft at 2nd floor and broke out on 4th and 5th. The flooring of 4th floor partly burned through and entire roof burned off.

The scrap rubber stock consists of all kinds of old rubber such as tires, tubes, hot water bottles, sweepings from rubber goods factories, also new rubber classed as defective or cast-off stock from factories. Goods received in bales or bundles, sorted, fabric stripped from same and rebaled. The hottest fire and greatest damage was done on sorting floor where the fabric was stripped and laid in loose piles ready for disposal. At times refuse, such as paper and rags, was found in the stock. It is evident that the fire spread with great rapidity where the loose fabric was piled. Intense heat was manifest, as some of the bales of rubber were literally melted or burned away. Although some of the bales were not broken open, the exterior resembled a chunk of lava or melted gum ready to run down the bale. In other places the heat and flames have eaten the life out of the rubber and left it charred dry.

RUBBER (raw) is the same as crude rubber.

RUBBER BOOTS AND SHOES—The upper and sole boot and shoe stock are made on calendars. Hazards are rubber cement, varnishing and vulcanizing. Rubber cement and varnish making should each be done in separate detached or cut off buildings.

RUBBER HEEL AND SOLE MANUFACTURING—Hazards are those general to most rubber mills, such as soaking, washing and drying rubber, compounding, milling and calendering. They are not so hazardous as ordinary rubber mills, because the naphtha hazard is not present. Churns and spreaders are not used. Where reclaiming is done the hazard is somewhat increased, as is also the liability of spontaneous combustion from corn oil.

RUBBERINE is a roof paint which is applied to Rubberoid, a roofing material, after it has been laid on the roof. The principal solvent of Rubberine in its manufacture is Petroleum Benzole. The mixture has a flash point of 95 deg. F. It can be thinned with benzine, naphtha or gasoline if it should not flow readily when applied.

RUBBERIZING FABRIC—Rubber grinding machines wash and remove the impurities. It is then mixed with mineral powders such as Paris white, pyrites, ammonia, etc., and dried by air. Some processes require the use of litharge, oils, resins, waxes, lampblack and barytes. A machine with two steel rolls grinds the mineral matter into the rubber. It is then churned in gasoline. The dissolved rubber is spread upon sheets of cloth in a spreading machine which coats the cloth, after which it is either coated with potato starch and printed, or the printing is done with a solution containing carbon tetrachloride as a solvent. All machines should be grounded especially at the knives of spreaders, to remove any static electricity. The rubber is vulcanized by being draped on racks in steam heated room at about 250 deg. F. or cured by passing the goods over a roll partly submerged in a trough of carbon-bisulphide, carbon tetrachloride and chloride of sulphur. The fabric or layers of fabric are sometimes starched to prevent adhering (if goods are rubberized *on one side only*). They are passed through

a starching trough and under a brush which removes excess starch (an open, hazardous starching process).

RUBBER LINED CLOTH is made by inserting a sheet of rubber between two thicknesses of cloth and drawing them through steam heated calender. The cloth is coated with talcum to prevent adhering when it is rolled up.

A fire occurred in one of these coating machines when in operation, probably from static electricity. The coating mixture was being poured into a tank which communicated with trough in "dope" (mixture) machine by pipe. The difference between "dope" machine and the spreader is that the dope machine runs over roller which revolves in mixture in trough, while the spreader mixture runs directly on the upper surface of stretched cloth and is spread out by the cloth passing under knife edges.

RUBBER, Mechanical—Process similar to manufacturing other forms of rubber. The rubber is made into strips or sheets from the crude stock.

RUBBEROID—See Rubberine.

RUBBER PASTE—See Gold Paste; see Niger Paste.

RUBBER RECLAIMING—Old shoes, rubber boots, hose and the like are used. Much foreign matter, such as nails, tacks, fabric, are extracted by hand. The stock is then cut up by hand and broken in small pieces in a "cracker," then placed in a lead lined wooden tank of sulphuric acid, which eats out the remaining foreign matter. It is then washed, ground, calendered, dried, mixed with coal tar residuum and vulcanized. A poor fire record class.

RUBBER SHODDY—Regenerated or reclaimed rubber consists of old rubber which has been subjected to chemical treatment to prepare it for further use in the rubber industry. Liable to ignite spontaneously. Called "springs."

RUBBER SUBSTITUTE—See Gold Paste; see Niger Paste.

RUBBER STAMPS—Work consists of gluing a felt backing to the wooden handle and cementing the sheet rubber facing to the felt. The lettering on the rubber is made by either cold or hot vulcanizing. Rubber cement is used for

cementing. Use gas-heated die presses. Handle making a separate industry. Poor fire record.

RUBBER TIRES for automobiles. Crude rubber is washed, cut, dried by air or vacuum, made into sheets. Fabric is impregnated with rubber in calender rolls, cut into bias strips (a cotton cloth being placed between strips to prevent adhering). Tire is built up in successive layers and cemented together with rubber cement, then worked on core or form. The rubber cover is applied and the mass pressed under hydraulic power, vulcanized, painted with chalk on inside, inspected and packed.

Some makes, when received from the factory, are wrapped in a waterproof paper, lined on the inside with a waterproofing solution containing black asphaltum. When this paper is thoroughly wet, the black sticks to the tires, and unless it can be readily cleaned off with benzine, the tires must be sold as seconds. All tire stocks should be skidded. Considered good insurance.

RUBBING OIL—That used by furniture dealers usually has a crude oil base. Rags saturated with this are subject to spontaneous combustion.

RUBBISH of most any sort is a breeding place for fires.

RUBBLE—Masonry of rough undressed stone.

RUBIA—See Madder.

RUBIDIUM—One of the alkali metals—a white soft metal found in vegetables with such intense affinity for oxygen that it burns in contact with air or water.

RUINS—See Fire Ruins.

RULES (for measuring)—Manufacturing—Foot rules, extension or sliding rules are usually made of wood and involve woodworking, light machine shop, paint and varnish hazards. A firm in New York City which makes the folding and extension rule claims an exclusive patent for making the slide rule, i. e., one in which each section has a groove at each side through which the adjoining section slides instead of folding. West Indian box wood is used for this work. The wood is planed, cut into lengths, grooved, holes bored for section connections, numerals and lines printed on the wood and the *sections* connected with brass parts. The wood

is dipped into colored paint or enamel and varnished and the brass parts are lacquered by dip process. They are dried either by natural or artificial heat. Hazards are woodworking, machine shop, lacquering, varnishing and enameling by dip process. Accommodation business.

RUN BARK EDGE BOARDS—Lumber with bark and irregular sides. Not as good as finished lumber.

S

SACCHARINE—Similar to sugar, the saccharine matter of the cane juice. It is artificially prepared from toluene, the substance found in the light distillate of coal tar. It is used in making candy as a sugar substitute.

SACKETT BOARD—Made of four layers of wool felt and three layers of gypsum plaster, the outer surface being felt. Made in thicknesses of ¼ inch, ⅜ inch and ½ inch. Fire retardant and a non-conductor of heat and sound.

SADDENING—In the mordanting of cotton, iron or copper sulphates are used for saddening or darkening.

SAFES of standard construction are rendered fireproof by the moisture held in the intermolecular spaces of the fireproof composition. When the safe gets hot this moisture is driven by the exterior heat into the interior of the safe in the form of steam, thus keeping the interior or temperature of the safe below the point of ignition or charring. This is proved after the safe has passed through a hot fire and is opened. Everything inside the safe is protected, owing to the condensation of the steam. Inspectors should measure thickness of all walls and doors. See Vaults.

SAFETINE—A benzine substitute. Flash about 93 deg. F. Classed as volatile.

SAFETY MATCHES—See Matches.

SAFETY-POWDER—Blasting compound composed of sawdust, spent tan, saltpetre, chlorate of potash and sulphur.

SAFETY RAZORS—Manufacture involves general machine shop work, buffing, oil tempering furnaces, cyanide baths, sawdust tumblers, also a combination grinding and honing machine through which the blade steel passes. As the steel band emerges, it is dried by being heated over a gas-heated *metal plate,* for the steel must be kept dried

to prevent rust. Considerable petrolatum is used to prevent rust. The blades are examined under Cooper-Hewitt electric lights, smeared with vaseline and wrapped in oiled paper. The blades are dried in gas ovens and given a thin coating of lacquer applied by dip process before being wrapped. Susceptible. Fair insurance.

SAFETY RELEASING LATCH—See Doors.

SAFETY-VALVE—A valve on a boiler which automatically opens at a predetermined pressure, and above which pressure it would not be safe to force the boiler. It lessens the danger of explosions.

SAFFRON is a yellow coloring matter obtained from the flowers of the crocus sativus, which are themselves of a blue color, but have yellow antlers. When these are dried and pressed into cakes they form the saffron of commerce, which is characterized by its very remarkable and somewhat agreeable odor. It is readily dissolved by water.

SAGAX WOOD—Made of ground straw with a cement binder.

SALAMANDER—A paper used between floors. It is waterproof and fire-resisting.

SALAMANDER—An open top, portable, cylindrical stove on legs. Used in buildings in course of construction, stone yards, sheds and foundries for heating purposes. Coal and coke are commonly used as fuel. They are the cause of many fires.

SALAMANDER WOOL—Is asbestos.

SALE OF PROPERTY—See Foreclosure Proceedings.

SALICYLIC ACID—A food preservative and used in medicine. A crystalline solid. Melts at 156 deg. C. Not hazardous.

SALIENT—An angle or corner projecting outward.

SALOL—A modern drug made by treating phosphorus with chlorine and carbonic acid gas. The product is mixed in a heated glass retort with powdered salicylic and carbolic acids.

SALOONS—The bar fixtures and advertising signs are usually owned by the brewery supplying the beer. Ordinarily only the stock is owned by the saloonkeeper. They are

onsidered good fire risks, and the loss ratio is very good. Saloons situated along water fronts and in "dive" localities catering to a low element are not considered good risks, but when profitable to the owners, can be written with caution. Prohibition legislation, police activities, etc., have forced many liquor stores out of business. Many fires in this class are caused by men of a nationality naturally hot tempered and quarrelsome, who may upset a stove or lamp in a saloon brawl. Usually have a gas stove on wood with rubber tube connection behind lunch counter and an unsafe swinging gas bracket in basement at ice box. There were approximately 116,000 saloons in the United States on Jan. 1, 1919. Prohibition has greatly reduced this number.

SAL-PRUNELLA is purified saltpetre.

SALT BLOCKS OR WORKS—Usually large area frame structures. Use high pressure steam and high temperatures for drying or evaporating. Steam pipes in contact with wood a dangerous feature. Fair insurance risks.

SALT DEALERS—The incidental hazards are mixing, milling and packing salt. Power belt conveyors should be given special attention by inspectors. Salt in bins is rendered inedible if wet with dirty water.

SALT HAY is recommended for packing material in glassware and other risks where large quantities are used. It burns very much slower than ordinary hay. In bales can be salvaged, if dried immediately, and still be used for packing material. See Packing Bins.

SALT HIDES—See Hides.

SALTED FISH in Barrels. If subjected to heat, the contents are apt to become mushy and be unfit for food. Those "mild cured," i. e., containing a less proportion of salt (brine), will be the most affected.

SALTPETRE—(Extracting saltpetre from nitre and chloride of potash.) A saturated solution of water and nitre is made in flat, iron, open-top, steam-heated tanks, to which is added chloride of potash. The mixture is boiled for about 24 hours, pumped to cylindrical steam-heated kettles where it is concentrated by re-boiling. Both the water and the residue are drawn off to open-top iron tanks where they are

allowed to settle and evaporate. The mixture at this point consists of saltpetre with impurities, dirt and sodium carbonate. The salt settles at the bottom of the tanks containing the water of solution, and after the water is drained off, the salt is shoveled out. The mixture, when evaporated, is placed in other tanks where it is boiled and washed, then crystallized in wooden tanks. The crystals are carried in a worm conveyor, and are dried while passing through a dryer which is usually frame, steam and hot-air heated. Brick drying ovens are sometimes used for the higher grades of crystals. The crystals are sifted and ground in burr mills. About 100 pounds each of nitre and potash will make 116 pounds of saltpetre and 60 pounds of salt. The nitre while in bags absorbs moisture from the air and is always damp. When empty, the potash and nitre bags are boiled to reclaim the remaining substances. The floors are soaked and dripping with saltpetre when the plant is in operation. If the plant were shut down, there might be some danger from spontaneous combustion in wood floors when very dry, as they are apt to ignite spontaneously, as do dry nitre bags. Swift burner. See Potassium Nitrate.

Saltpetre or Potassium Nitrate is found principally in the warm sections of India where rain rarely falls. It is produced by the decay of nitrogenous substances in the presence of air, moisture and alkaline earths. It is used in the manufacture of high explosives, gunpowder and fireworks, as a preservative and for medicinal purposes.

Saltpetre and Nitre, storage and handling—Like the chlorate, it gives up its oxygen very readily and has many similar characteristics. In contact with any combustible matter it decomposes rapidly, five-sixths of its oxygen being available for the oxidation of combustible matter. Its capacity for supporting combustion will be appreciated when it is known that one volume of nitre represents 3,000 volumes of air in its power for supporting combustion. Fires in the empty bags in which the nitre has been kept are therefore imminent and burn fiercely. In fact, in the presence of carbon (as in wood) nitre burns stubbornly in all cases. When in contact with hot coals occasioned by an external

fire or by a fire resulting spontaneously it deflagrates violently. It oxidizes sulphur with unusual ease.

SALT WATER IN PIPE MAIN—The installation of a fire main along the water front for the use of salt water, pumped by a fire boat, is a splendid adjunct to the fire protection of a city having a water front. In case there is a shortage of water in the City supply or a very severe fire calling for such a discharge of water that the pressures become low, such a system would aid the fire fighters materially.

SALTS—This term applied by chemists means substances resulting from the neutralization of acids by alkalis. The metal part of the alkali combines with the salt portion of the acid, water being given off at the same time.

SALVAGE (buildings)—When a large fire is reported most insurance companies immediately send an inspector to make a rough estimate of the amount of loss, so that they may know their approximate losses each day. In a six story and basement brick building of ordinary construction, the brick walls can be figured at 40 per cent of value and 8.5 per cent for each floor and roof. See Appraisal.

SALVAGE CORPS—The New York Salvage Corps is maintained by the New York Board of Fire Underwriters for the purpose of salvaging goods when a fire occurs. Tarpaulins are thrown over the merchandise, water is pumped out of basements, temporary roofs are put on buildings, to prevent further water damage. A patrolman is stationed on the premises to prevent removal of goods by trespassers. The corps is financed by the company members of the Board of Underwriters by a system of taxation according to the amount of premiums received by each company in the territory covered by the Salvage Corps. A number of wagons are employed which race to the fire when an alarm is sounded.

The New York Salvage Corps now employ a gasoline-driven pump which will pull 1,800 gallons of water a minute out of any flooded basement. Care must be taken where

the "forced out" water is thrown or there is a likelihood of choked sewers and more trouble.

SALVAGIBILITY OF SUNDRY STAPLES IN CASE OF FIRE AND WATER DAMAGE—Cotton if merely wet can be dried; if burned and wet superficially, the damaged layers of the bale can be peeled off; if badly burned, the unburned portions can still be separated and sold. Flour in barrels will absorb water only so far in from the heads and sides but inside of the damaged area good flour will be found. Even the badly wet flour is good for paste, dextrin, etc. Wet wool can be spread, dried and rebagged, or it can be converted into scoured wool, etc., etc.

SAMPLE CARD MAKING—Manufacturing is principally cutting and printing cardboard and pasting samples of cloth, etc., on same. Hazards of glue pots and printing presses are present. Fair insurance risks.

SANDIVER—The scum of liquid salt and sulphate of soda.

SANDOY—See Pyronome.

SANDPAPER MACHINE, for smoothing stock—There are five types—belt, drum, disc, spindle, and slip-and-slap. Belt sanders consist of carrying sanders or other belts covered with sandpaper operating over two pulleys some distance apart. Drum sanders are cylindrical in shape, resembling planers. Disc sanders consist of discs covered with canvas and at the end of shaft, revolving rapidly. Spindle sanders are small in diameter and either vertical or horizontal. Slip-and-slap sanders consist of strips of sandpaper fastened to hub-radials. All these machines create a great deal of dust and should have blower systems attached.

SANDPAPER MANUFACTURING—See Emery.

SANDSTONE, used for building fronts, withstands the action of fire better than any other stone front. The fire and water will in time flake off the stone.

SAN FRANCISCO FIRE—A brief summary may be interesting: Date of earthquake shock, April 18, 1906; time, 5:13 a.m.; fire broke out at 5:25 a.m.; duration of fire, seventy-two hours; area of burned district, about 2,635 acres; in city blocks, 514; length of fire line, ten miles; loss of life (*acknowledged*), about 2,000; total received from relief fund,

ver $8,000,000; California loss ratio for the year, 1013.3 per ent; total property loss, in excess of $350,000,000; insurance oss, about $175,508,530; total insurance paid about $195,000,- 00; fire insurance companies involved, 243; companies retired uring the year, twenty-one; money sent over by foreign ompanies, more than $60,000,000; money paid in by Ameri- an companies, more than $40,000,000; number of claims djusted, about 150,000. Total insurance loss to companies hrough the world, including reinsurances, between $220,- 00,000 and $225,000,000. This single conflagration cost the ompanies nearly $80,000,000 more than all the profits they ad made since 1860. It is remarkable that so few of them vere compelled to retire from business.—The Adjuster, San Francisco, April, 1918.

SANGAJO—Flash point 139 deg. F. Classed non-volatile.

SANITAS—A disinfecting and preservative solution made by forcing a current of air through vessels containing hot water and turpentine.

SANTONE—A floor oil classed with paraffine.

SAPONIFICATION—Decomposing fats into fatty acids and glycerine, as in soap manufacturing.

SAPON-WOOD—A dye wood.

SARDINE FACTORIES—The fish are dumped into a conveyor and carried to the cutting room, where in the case of large fish, the heads and tails are removed by knives and the entrails cleaned out. They are then washed automatically and scales are removed by attrition during the conveying and washing. The fish are then deposited in pickling bins. An endless belt with cups scoops up the washed fish, elevates them to the packing room and deposits them on a flaking machine. This machine has a carrier belt which receives fish from the conveyor and deposits them side by side and passes them between large hollow belt-covered squeeze rolls which removes the excess water. The fish are then deposited on metal trays or "flakes," and as the trays are filled they are removed to the dryers or the cooking ovens. The hazards of cooking, drying, oil filling, washing and *testing require* special attention. Accommodation class.

SASH—The framework which holds the squares of glass in a window.

SASH, DOOR AND BLIND FACTORY—A combined woodworker and planing mill. Use gas-heated embossing press for moulding and benzine thinned paint for priming; also do sash glazing. Inspect for care of shavings and refuse. Fair insurance risks.

SASH FRAME—The frame which receives the sash.

SATOLITE—A substitute for celluloid made from soya beans. Claimed by the manufacturers to be non-inflammable.

SAUSAGE CASINGS—The casings are packed in salt in barrels, pounded down to make them compact, and water is added to fill the barrel. Dirty water will have a very bad effect, especially to the stock at the top of the barrel. Excessive heat will injure the quality of the casings.

SAV-ON SPIRITS—A benzine substitute classed as non-volatile.

SAWDUST mixed with bicarbonate of soda has been found efficacious in extinguishing oil and grease fires. Sawdust in a finely divided state excludes the oxygen from the fire, without which it must die out. It is used by storekeepers, in factory spittoons, and at gas engines and motors. No sawdust should be permitted on the floor (except in meat and fish markets). Sand should be substituted in place of sawdust for absorbing oils.

SAWDUST SPITTOONS should not be permitted.

SAWDUST SUBSTITUTES—See Perolin, also Hold Dust.

SAW FACTORIES—Metal working, machine shop and woodworking hazard with painting, annealing and tempering. Saws are oiled to prevent rusting.

SAW MILLS—Usually located in woods along a stream of water from which it obtains power to operate. If no water power is available, a gasoline engine is generally used. Log saws are the main machines with cross or rip saws and special saws for cutting shingles or boards. Some of the hazards may be sawdust and bark piled in heaps around the mill, the gasoline improperly handled, or the engine im-

properly set and workmen smoking about the premises. The underbrush and scrub should be kept cleared for a considerable distance so as to prevent forest fires starting in the vicinity of the plant. Inspect for blower and shaving vault. Fair insurance. See Planing Mills.

SAW-TOOTH ROOFS—They are shaped somewhat like an inverted V and are generally used by textile mills and machine shops because they slope like a mound and offer better lighting facilities than the flat skylight. They are sometimes called "Northern Lights."

SAXIFRAGINE—See Baryta Powder.

SAXON BLUE—A mixture of indigo, sulphuric acid, potash and water.

SCALE WAX—Is crude petroleum. Used in waterproofing.

SCANTLING—A timber less than five inches square at the end.

SCENERY STORAGE—Warehouses of this type require large areas, with ceilings 10-25 feet or more high. Scenery may be packed from floor to ceilings, with poor aisle spaces. A poor stock to insure as it may be obsolete. Usually have facilities for repairing or repainting damaged parts. Swift burners. Serious exposure to surrounding buildings. See Theatrical Warehouses.

SCENIC STUDIOS are buildings where stage scenery is painted. The main part of the studio building is a very high one-story tower-like structure, sometimes equaling a five-story building, which permits the stretching and painting of very large canvasses. Use coal or gas stoves for heating glue for sizing, and water. May also use benzine thinned paint. Considered poor fire risks.

SCHEDULE (as used for rating purposes) is a copy of the rating bureaus' make-up of rate, i. e., base rate of metal workers is 75 cents, plus .05 charge for skylights, plus .10 charge for floor openings, makes an insurance rate of .90 per hundred dollars. In New York City, there are approximately 20 different schedules in use.—(H. G. Boyle.)

SCHEDULE is a general form used in writing insurance on plants consisting of several buildings instead of writing a

separate policy on each building or contents thereof. Large firms usually designate each building of their plant by a letter or a number. The amount of insurance covering on or in each building is noted alongside of each designated building in the schedule and the insurance companies write a certain percentage of the entire schedule. This also simplifies matters for the assured and reduces danger of non-current forms. See Blanket Policy. See Proportion.

SCHEDULE EXPERT is primarily an inspector of merit who is thoroughly conversant with the many schedules in use. He must be well versed in construction, hazards, salvage of various merchandises, heating apparatus, chemistry, etc. Most of the large insurance companies employ one or several of these experts to work on the schedules for brokers. Their mission is to reduce the rate of insurance to its lowest figure by installing fire protection and other devices.

SCHOOL HOUSE FIRE HAZARDS—Fire losses on school houses have been excessive for a number of years and are steadily increasing. Because of this fact the experience of the insurance companies on the class was collated recently, and it showed that for the five years ending with 1917 the loss ratio has been 75 per cent. This means a heavy deficit, and, in consequence, an increase of rates on school property is inevitable.

Modern educational methods have greatly increased the school house losses through their introduction of new hazards. Manual training departments practically bring the factory hazard into the buildings in which large numbers of children are housed. Kitchens are provided for the domestic science department and for the serving of meals to the pupils. Moving picture machines are in general use for educational purposes and entertainment, and the chemical and physical laboratories all present serious fire hazards. In addition, there is the increased use of school buildings as social centers for parties and dances and public meetings, involving the cigar and cigarette hazards.

These conditions apply chiefly to schools in the larger towns and cities, although many of these features are being introduced in the smaller towns and even in the township

schools, which are supplementing the old district schools in the country. The record on unprotected schools is particularly bad, but even in towns with fire protection the class has been unprofitable. In fourth class towns the school house is often the largest risk, and the fire department is inadequate to cope with a fire once well started; while in towns below the fourth class the protection is negligible for a large building. The majority of fires are due to the heating apparatus. In the country schools heating-stove fires are frequently started by coals falling from the open doors after the teachers and pupils have gone. In the larger cities, where regular janitors are employed, the losses due to the heating hazard are less, but in the smaller places, where the work of the janitors is incidental, they fire up but once or twice a day and the blazes start in their absence. Defective electric wiring and poor housekeeping are also prolific sources of school house fires, while the increased use of soft coal because of the fuel shortage, and of inferior grades of such coal, has led to many defective flue and sparks-on-shingle-roof fires.

Improved construction, better housekeeping and careful inspections are the principal remedies for these deplorable conditions. The tabulation of losses showed that the experience had been better in Ohio than in any of the other States considered. This is attributed to the superior building laws of that State relating to school houses, which were enacted after the burning of the Collingwood school, in which nearly 150 children lost their lives. Ohio requires that all school buildings more than one story high must be of fireproof construction, and the fire prevention regulations are strictly enforced by the State fire marshal, who also makes specially careful inspections of school house risks. Other States should not wait until they have a similar holocaust before safeguarding the lives of their children.

The hazards are manual training rooms, with oily rags, rubbish, shavings, glue-pots, and domestic science rooms with gas stoves; janitors' rooms with floor oil, paints for use about building, janitors' supplies; small repair shop, and storage rooms for old fixtures and desks; floor mops, chem-

ical laboratory. Where plumbing is taught small plumbers' shop hazard.

Inspectors should be very careful to note the termination of the air ducts in schools built a decade ago, whether they terminate at the floor of the attic or are carried through roof. Unless through roof, a fire can be sucked through the duct to the attic and burn off the roof.

SCORER—A device for incising pasteboard so it will fold properly. Also cuts to design.

SCOURING SOAP POWDER, usually made of caustic soda, soda ash and silax. Scouring soap same as above with cocoanut oil added.

SCRAP LEATHER—Goods of this character are not an attractive salvage proposition at best and in this case the difficulty of recovering them owing to the collapse of floors entailed an unusual expense. Lesson learned at fire, 35-7 Frankfort Street, New York City, Sept. 21, 1918. See Leather.

SCRATCH COAT of plaster; the coat applied directly to the lath, then scratched with a trowel to form a key for the finishing coat of plaster.

SCREED—A wooden strip or a strip of mortar laid on a wall to gauge the thickness of the plastering to be applied.

SCULPTORS' STUDIOS—Work consists of composition, plaster, clay, bronze, and stone-work, and occasionally wood-working of frames.

SCUPPERS—Holes or tubes to allow the floors to be drained of water in case of fire. If standard scuppers are installed they usually have a bearing on the insurance rate; generally used in warehouses and fireproof or mill constructed factories. See illustration, page 433.

Scuppers (inspection of)—Probably nothing is more often overlooked than the condition of scuppers where these have been placed in the construction. Oftentimes scuppers are rendered valueless, being completely choked up with sparrows' nests and inspectors sometimes find that the occupants cover the scuppers with boards in order to prevent the cold air from reaching their feet. The sparrows may be circumvented by installing a small wire net to prevent their

entrance. The use of scuppers in good condition (for preventing serious water loss) is so important that it is deserving of more consideration by fire inspectors and might properly find a place upon insurance inspections blanks. Inspectors should note if the flap check is in working order. This flap check is on the outside and designed to prevent drafts, and quite frequently becomes corroded or rusted and is held tightly shut so that water could not flow out. Screens or bars should be placed so that refuse cannot readily enter the scupper. "Flush" or pipe scuppers on the interior of building should be piped so that water cannot discharge inside of the building.

SCUTCH—Adulterant of bone dust; is ground oyster shells and tan pit refuse.

SCUTCHING (in bleach works), the process of opening the cloth after it has been washed.

SCUTTLE—The small opening leading to a roof.

SEA GRASS—Used for upholstering and polishing furniture. See Piano Manufacturing.

SEALING WAX—Made of chalk, barytes, rosin, astral oil, turpentine, shellac and coloring matter. The rosin is cooked in gas-heated Mott kettles. The wax mixture is cooked by direct fire heat. When melted, it is poured into gas-heated iron moulds, pressed and allowed to cool. The surface is polished by a gas-heated, all-iron, box-like apparatus on wheels traveling on tracks, which passes back and forth over the surface of the sealing wax slab. Hazards of direct fire heat for rosin and wax kettles.

SEAMEN'S OUTFITTERS—The stock consists of men's furnishings, hats, caps, ready-made overcoats and clothing, notions, novelties, toilet soaps, perfumes, overalls, oil suits, rubber boots, shoes, cheap jewelry, musical instruments and similar articles used by sailors on board ship. Accommodation class unless well established. See Ship Chandlers.

SEARCHLIGHT ENGINES are used by the New York Fire Department in cases where the lighting system of the building or street has been put out of commission on account of fire.

SEASHORE HOTELS—Usually large area frame, sub-

ject to sweeping winds, undermining by high tides, etc. Season occupancy. Few companies write them. In case of bad season by reason of epidemics, unseasonable weather or similar circumstances, a severe moral hazard creeps in. See Hotels.

SEBASTIN—A high explosive.

SECOND-HAND STOCKS should always be avoided. Sometimes when a line covers new stock, together with second-hand stock, a clause is added, "It is understood and agreed that this company shall not be liable for a loss or damage to any of the above-described property for an amount in excess of the actual cost price to the assured."

SECRETAGE PROCESS—A process of crisping hair to make it into felt by means of mercury and nitric acid.

SECRET PROCESSES should not be written, even though the inspector is told "nothing of a dangerous character is used," because the fire record shows that in many instances this statement has been untrue or misleading.

SECURITE—An explosive compound.

SECURITIES—Cannot be insured. See Uninsurable Property.

SEED CLEANING—Sifting and screening produce much dust and no open lights should be permitted. Grinding of seeds and herbs is also occasionally done. A poor class. Accommodation business.

SEED OILS—Extraction by carbon disulphide, gasoline, benzole or petroleum ethers is always a very hazardous process. See Oils. See Vegetable Oils.

SEEDS IN BINS on storage will not burn readily, but when wet will sprout and be rendered useless. The swelling of wet seeds and hops in large quantities in compact masses has been known to push out the walls of brick buildings. When decaying, methane or marsh gas is liberated.

SEGMENTAL ARCH—A curved arch, forming the segment of a circle.

SEIDLITZ POWDERS contain bicarbonate of soda, Rochelle salts and tartaric acid. The hazards are grinding, mixing and sifting. The manufacturing process is hazardous.

SELENIUM—The chief use of selenium during 1919 ap-

ı have been as a decolorizer for glass as well as in ıufacture of ruby glass. The former use was devel- rough the shortage of suitable grades of manganese, eretofore has been used to mask the green color im- ›y the presence of iron.

'-CLOSING DOOR—One ordinarily closed and loses automatically after being opened.

'-REDUCING CLAUSE—Used in connection with d insurance. See Profits of a Lease.

'-RELEASING BEAMS—Beams which have sloping They are placed so that if they collapse or burn , the wall will not be pulled down as would be the squared end beams were used.

[NARIES—See Academies.

ƷITE—A new explosive with a gun cotton base. The ı derived as follows: the first four letters were de- y using the initial letters in the following words: ıte, explosive, no glycerine. The last three letters ɜn from the word dynamite.

PENTINE PAPER—Colored; used for decorating papers.

/ANTS—In order to protect the property of guests vants who may have personal effects in the assured's ı case of fire, most household furniture forms read as : "The property of the insured or any member of sehold, their guests or servants."

ıMUM OIL—See Teel Oil.

[ING—Term used in boiler or furnace installations to the enclosing walls.

:N OIL—Same as olive oil, shale oil and petroleum. quid yields on fractional distillation a heavy volatile lammable gasoline.

ERS FROM GARAGES—These are used for drain- the surface of car-cleaning floors, the water from contains oils and grease and gasoline. The sewers ays warmer than the air above the streets. In many ıey are made warm from the escape of steam or hot 'rom factories. With volatile oils in the sewer, we :e have the conditions for their ready conversion into

vapor. The gasoline vapors rise and mix with the air, while the heavy oils find their way into the river, or when the mouth of the sewer is closed they gather at the water level within the sewer at some distance from the river, to be discharged only at low tide. Some ordinances forbid the throwing of gasoline into the sewer, hence oil separators are required in garages. See Oil Separators.

SEWING MACHINE FACTORIES—Usually large area plants of numerous small and large buildings in a group. In brief the hazards are: Foundry on a large scale, machine shops, forging, soldering, annealing, japanning of metal parts, assembling, woodworking and finishing, tool making, making separate parts including nickel-plated ware; crating, packing and shipping. Good insurance risks if hazards safeguarded.

SEWING TABLES—Where a double row of tables is used a continuous trough should be built between the rows in which to place the work as it is made, thus preventing it from falling in between the rows of machines. See Cutting Tables.

SHACKS—A name peculiarly descriptive of makeshift frame buildings. Chimneys are usually faultily installed. Not desirable insurance risks.

SHADE FACTORIES—See Window Shade Factories.

SHAFTINGS AND BEARINGS of all sorts may become dangerous on account of overheating, due to poor alignment, binding, or insufficient oil, especially if connected to rapidly moving machinery. They are likely to become oily, and to accumulate dust and inflammable "fly" or lint, and also saturate nearby woodwork with flying oil.

SHAFTS—Open shafts are the quickest and most natural means for a fire to travel through a building, aiding the quick destruction of the building and endangering the lives of the occupants. One of the most important construction features. Underwriters reduce their line when these open shafts are reported on an inspection blank. See Dumbwaiter Doors.

SHALE OIL—Yields on fractional distillation a highly volatile and inflammable gasoline.

SHANTIES are K. O. risks.

SHAPERS OR FRIEZING (spindles) consist of two vertical projections through a table and rotating rapidly in opposite directions. They make considerable refuse and bearings become overheated. Classed as heavy woodworking machines.

SHARP FREEZER—In cold storage risks, term used to designate temperatures colder than 10 deg. F. below zero.

SHARP SAND—Sand, the particles of which have facets with sharp edges.

SHAVING SOAP—Made principally of tallow, stearic acid, palm oil, barium chloride, peroxide of hydrogen, oil of eucalyptus. A steam process, using kettles, filters, stills, rolling and moulding presses. They may also use solution of lye, ammonium sulphate and glycerine. Generally accommodation business.

SHAVING VAULTS should be constructed of brick or concrete walls not less than 12 inches thick and parapetted at least 3 feet above roof and situated outside of building, with no communication. The roof to be of fireproof material with proper vent. The floor to be of concrete, with an incline from the rear to the front. There should be only one opening, three feet from floor (not over 9 square feet) for the removal of the shavings to the boiler room, and this opening should be protected by a ¼-inch boiler iron drop door, operated automatically in vault channels, which should be bolted through the wall. The boiler iron vault door opening just mentioned should be at right angles to the firing door of the boiler and not nearer than 6 feet from same. Steam jets or automatic sprinklers are sometimes placed inside of the vaults. Feed-pipes which empty their shavings directly into the boilers are not recommended. Vault should be used only for the storage of shavings and dust. No machinery, shafting or belts should be operated within or pass through the same. See Direct Feed.—(See Illustration on page 80.

SHEATHING—Matched or unmatched boards on the exterior of a building, or covering a surface with wood boards, metal, etc.

SHEAVE—A grooved pulley with block and bearings, fas-

tened to a wall by sheave brackets and over which cables or ropes are run.

SHEEP AND PIG SKINS—A large amount of natural oil is contained in these skins, and this must be extracted before tanning, otherwise the oil will continually ooze out of the skin after finishing. The extracting, which presents a serious hazard, is done by soaking in naphtha. See Hides.

SHEEP DIP sometimes contains inflammable liquids. A liquid into which sheep are dipped to remove vermin.

SHEEPSKIN—Dyers and dressers use sumac, logwood, quebracho, sulphuric acid, ammonia, alcohol, anilines and potash. Splitting skins, staining with air brush, embossing fancy articles, greasing, fur dyeing and dressing, are principal hazards.

SHEETING—See Lagging.

SHEET TIN—See Tin.

SHELLAC—A resinous exudation produced by the puncture of a species of insect which congregate in large numbers on the tender branches of various East Indian trees. The insects become surrounded by the resinous exudation which gradually hardens, and in which the larvæ of the female remain. Shellac dissolves in alcohol, muriatic acid and acetic acid.

Shellac is usually imported in burlap bags. When received, it is in large chunks because the heat in the steamship causes it to slightly melt and then when cooled it is in lumps. The lumps are first broken with hammers, then further broken up in smaller and still smaller pieces and powdered in different mills and grinders. These mills are all iron construction. The powdering mill revolves rapidly, the others much slower. The powdered shellac is placed in large tanks into which is poured denatured alcohol and the mixture stirred until the shellac is liquefied. It is then put up in barrels, cans or bottles. The original color of gum lac (gum shellac) is a dark brown. Various lighter colors are made by bleaching. This is done by placing the ground shellac in concrete lined, steam heated, wood tanks with weighed quantities of *sulphuric* acid, soda ash and water, or chloride of lime, *sulphuric* acid and water. This is agitated or mixed for a

time and then dropped by gravity to similar tanks on a lower floor where it is again agitated and more bleaching powder and acid are added. When mixed, cold water is added which removes the excess acid and cools the shellac, which is taken out in large cakes, ground, pulverized and cut with alcohol. Fair insurance class.

SHELLAC VARNISH—Same as liquid shellac.

SHINGLE ROOFS of wood should not be permitted. The fire record shows many fires from this type of construction. If a building has a wood shingle roof, the chimney should be provided with a spark-arrester or extend 3 feet higher than the roof. See Spark-arrester. See illustration, page 588.

A patented fireproof shingle is now being made of felt saturated with asphaltum, in which ground rock is imbedded, coated with asphalt and finished with ground slate.

SHIPBUILDERS' YARDS usually have many low frame buildings with power wood-working and metal-working. Foundries, blacksmith shop, welding with compressed gases, and painting are principal hazards. Not a profitable class with most companies.

SHIP-BUILDING (Hazards of)—In **Wood Ship-building** yards, large woodworking machinery, large quantities of sawdust, shavings and chips (recommend shavings vault and blower system). Accumulation of waste wood and chips under hulls in shipways. This space should be constantly kept cleaned up and refuse removed. Lumber in yard, clear space rules should be strictly adhered to. Storage of oakum should be kept in detached building a safe distance from ways and other buildings. Spinning of oakum should be done in a separate building from main oakum storage building, both to be properly ventilated at eaves and ground level and screened with fine wire mesh. Heating of pitch and creosote important; steam only should be used. This work should not be done on the ships. Oils and paints, etc., should be stored in a separate and preferably fireproof building. Burning of waste material for fuel, special care should be taken to see that stacks are provided with approved spark arresters. Glue heaters in joiner's shop should be according to underwriters' rules. Locomotives and Gantry cranes should

Photo Courtesy International Film Service.

Shingle roofs Note the spreading fire.

be inspected for fuel used. Storage of fuel-oil and supply stations should be underground. (J. H. Ryan.)

SHIP-BUILDING YARDS (Steel)—Principal hazards are machine shop work, storage and use of fuel oil for riveting furnaces. If a portable furnace is used on board ship and under ways there is danger of hot rivets setting fire to wood chips and temporary planking. Fuel oil should be kept underground in tanks as per Underwriters' rules, and no pressure systems permitted. Main supply of oakum to be stored in a well-detached building. Spinning of oakum to be done in a separate room from the main storage, and both storage and spinning rooms to be well ventilated. Storing oils and paint, woodworking, tree nails, timber planing, wooden clothes lockers, heating and lighting systems to be in rooms of standard construction. The daily removal of chips and shavings from shops is necessary. Space under keels to be kept free of waste material. Smoking to be strictly prohibited. (J. H. Ryan.) See Canals and Feeders.

SHIP CHANDLERS—Stock consists of those things which are required by seamen on board ship, such as oiled clothing, clothing, parts of machinery, lanterns, oils, heavy hardware, ship's tackle. A hard burning stock, not easy to extinguish. Serious exposure to surrounding properties. See Seamen's Outfitters.

SHIP FIRE PREVENTION—It is recommended that vessels be required to be equipped with spark-arresters and that their funnels, or smokestacks, be covered with an efficient metal spark-arrester (the wire mesh, which shall not be less than four to the inch) when crossing the pierhead line in approaching any grain elevator or any pier. The owners of such vessels should be required to protect all hatch combings, so that cargoes of cotton or naval stores shall not come in contact with the combings; also the vessels should be required, while loading or discharging cargoes, to couple their firehose and keep the same ready for use at all times. See Fires at Sea.

SHIRTWAIST MANUFACTURING—See Waist Manufacturing. See Garment Workers.

SHODDY is picked rags, shredded and torn apart by pick-

ers. It may be wool or part cotton. If all-wool shoddy is desired, the stock is "carbonized" by removing the cotton in vats of dilute sulphuric acid and chloride of aluminum. The wool is then washed in alkalis, dried in high-temperature dryers, "picked," and bailed. A poor class of insurance.

SHODDY AND MUNGO REFUSE is used in manufacturing artificial guano. After being dried and pulverized, it is used by wall-paper manufacturers as "flock."

SHODDY MILLS—Picking and carding are hazardous processes. The shoddy is usually conveyed from the pickers to the baling room by suction ducts. Only steam heat and electric lights should be used. Few companies write this class.

SHODER—Skin holding gold to be beaten into leaf, in second stage of manufacturing gold leaf.

SHOE FACTORIES—The upper leathers and linings are cut either by hand or power die-presses. These are stitched or cemented together and attached to the inner sole. The centre of the sole is "filled" or waterproofed, and the outer sole put on and trimmed smoothly. In the finishing department, the sole and heel are sandpapered, stained, waxed and polished and the uppers cleaned and polished. Considerable rubber cement is used. Safety pots only should be used for rubber cement and the supply of cement and naphtha kept outside of main buildings. Cement with a binder of ground cork is usually used for a **filler** for soles (between the inner and middle sole). **Edge-setter machines,** which sew the soles with waxed threads, have a pot of wax through which the thread runs. The pot is usually heated by steam or gas, steam preferred. Buff wheels for polishing, **sandpapering** machines, and **heel-trimmers** should have blowers. In the **lasting** department, where the workers hand-sew the uppers to the soles of turn-shoes, gas or electric stoves are used for heating the hand-tools. In the finishing department, benzine may be used for removing spots. A very important hazard is the **cutting-board scrapings.** The **cutting boards,** where leather is cut either by hand or power, are dressed with a *dressing* composed mainly of glycerine, linseed oil and car-

bolic acid. They are dressed (scraped to remove ridges) by hand. The boards are of hardwood, the scrapings are in a finely divided state, and when mixed with the dressing are peculiarly subject to spontaneous combustion. These scrapings will ignite in a few hours and are considered by some manufacturers to be more hazardous than the use of rubber cement and benzine. Fair insurance risks, if hazards well safeguarded.

Box Toes are stiffened with dextrine and glue. Celluloid is also used for box toes, heel coverings and counters. The celluloid is usually found in the "lasting" department. Alcohol and acetone are used to soften the celluloid. Heels are often covered with celluloid, for ladies' shoes, the celluloid being softened and applied by presses, trimmed, cemented and buffed.

Shoe Tips, after being perforated, are singed over a gas flame to give the leather a clean edge, after which they are dipped in dye (sometimes naphtha dye) for the desired color.

Waterproof Compounds for Shoes—Trade names are Viscol, Resisto, Repello, Anti-hude, Soleoil, Relyt and others. They are oily substances and some are thinned with naphtha.

Dip Black is made of lamp-black and naphtha.

Oilproof—Made of gelatine and carbolic acid dissolved in naphtha. It is put on the inner part of outer soles to prevent the natural oil of uppers from staining the lower part.

Boot Dressing for uppers is made of lamp-black, gum tragacanth or soap. The leather is soaked in water, covered with blacking to lay the nap, dressed, and oiled with neat'sfoot oil.

SHOEMAKERS' FINDINGS—Miscellaneous findings consist of leather, buttons, nails, polishes, brushes, rubber cement, stains. Most of the goods are in small pasteboard packages, on shelves. Water will rust the tacks, nails, pegs and handles of tools, but the balance of stock ordinarily gives good salvage.

SHOE PASTES are made of carnauba wax, paraffine, turpentine and colors. The mixture of waxes is melted in a steam kettle or over open flame. Color is added and then allowed to run into tins and cooled.

SHOE POLISH may contain shellac, nigrosine, caustic soda, potash, aniline colors, salicylic acid, japan, beeswax, oil of mirbane, alcohol, ammonia, lamp-black, glue, benzine, gum tragacanth, carnauba and candelia waxes and borax. Hazards of direct fire heat for kettles, oily floors, storage of raw materials. Serious exposure to surrounding properties. Firemen experience difficulty in locating seat of fire on account of dense smoke. A quick burner. A poor fire record class.

SHOES, RETAIL—Considered very desirable insurance. Stocks usually give considerable salvage. Inspectors should note if any work is being done on premises.

SHOOKS—Sets of boards in knock-down shape, used in crate or box-making.

SHOOTING GALLERIES usually occupy grade floors or basements. Some are located in poor sections and cater to a low element. Temporary occupancy with makeshift heating apparatus, smoking, oily rags for wiping guns, gas lights in rows under targets, and untidiness constitute the hazards. A K. O. class.

SHORING—Bracing by means of props.

SHORT CIRCUIT—A contact between electrical conductors of different potentiality without the intervention of resistance, so that for an instant a theoretically unlimited current flows through the conductors and the contact point. See Electrical Terms.

SHORT-RATE TABLE FOR ANNUAL OR SHORT TERM POLICIES—In writing short term policies (i. e., policies having a shorter term than one year), and in cancelling at short rates either short term or annual policies, charge or retain the percentage of annual premium indicated in table on page 593 opposite the time for which computation is made.

SHORT RATE (Explanation)—The standard term for fire insurance policies and one upon which the rate is quoted is one year and it is felt therefore that when a request is made for insurance for a shorter term than one year, the company's liability for that shorter time, during which a fire may readily occur, is as great as under the annual policy *while the premium* is much less; therefore the premium

should be at a higher proportion. This is only a variation of the principle as shown in the mercantile business between the wholesale and the retail price of merchandise. The retail merchant, on account of the greater expense of securing his goods and distributing them, is obliged to charge a higher price than that of the wholesaler; so the insurance company if obliged to write a number of **short term** policies instead of a one-year policy, increases its expense in so doing. The similarity of this principle is also shown in the fact that insurance for three or five years is written at a proportionate reduction of the rate. See Cancellations. See Pro Rata.

SHORT-RATE TABLE

Time, Days	Percentage to be Charged or Retained	Time, Days	Percentage to be Charged or Retained
1	2	19............	16
2	4	20............	17
3	5	25............	19
4	6	30 (1 month)	20
5	7	45............	27
6	8	60 (2 months)	30
7	9	75............	37
8	9	90 (3 months)	40
9	10	120 (4 months)	50
10	10	150 (5 months)	60
11	11	180 (6 months)	70
12	11	210 (7 months)	75
13	12	240 (8 months)	80
14	13	270 (9 months)	85
15	13	300 (10 months)	90
16	14	330 (11 months)	95
17	15	360 (12 months)	100
18	16		

SHOT GUN FEED—The long steam cylinder in which work the piston and rod operating a saw-carriage in a saw-mill.

SHOW CARDS—Printing and lithographing hazards with coloring by air brush. Susceptible. Fair insurance risks.

SHOW WINDOW COMMUNICATING WITH SUBWAY—See Communication by Completed Subway.

SHRAPNEL, in ammunition manufacture, is composed of three major parts, the cartridge, the projectile and the fuse.

SHREDDED TIMBER—See Excelsior.

SHUMAC—Another name for Sumac.

SHUTTERS—All windows should be protected either by standard lock-joined shutters (similar to firedoor construction), or iron shutters having angle-iron frames. The old style "flat bar" iron shutters are not recommended because they buckle under intense heat. Most engineers advise wired-glass windows in "labeled" hollow metal frames instead of shutters, because they are sure to be in place when a fire starts. Many risks protected by shutters have suffered severe damage because they were open and could not be closed in time to prevent fire from entering. See Window Protection.

SIAMESE CONNECTION—Called fire department connections. An intake pipe located outside of a building, with two hose coupling connections. In sprinkler systems they are connected with header system or at base of live riser. In standpipe systems they connect with riser. In both instances there is a flap-checked valve between the riser and the inlet. The outside connection should point horizontally and be at least 18 inches above the sidewalk, in order that the fire department can make a quick hose connection to the siamese from the steamer or hydrant. Many siamese connections point downward and are only several inches above the sidewalk, making it almost a physical impossibility to connect the hose. Siamese should have a wire mesh screen protection placed inside and near outlet to prevent placing obstructions therein. See Standpipes and illustration, page 644.

SIDE CONSTRUCTION—In fireproof arches, the terra-cotta blocks are placed on their sides.

SIDEWALK STANDS may have gasoline torches for light, electric wires on nails, swinging gas brackets or an unsafe stove for heating or cooking.

SIGN PAINTING—Light painting hazard. All colors are *in small lots* but considerable turpentine is used, and some-

times benzine for cleaning brushes. Usually located in "rundown" properties. Not a very desirable class on account of character of work, smoking, oily rags, crowded conditions and making wood frames.

SIGNS (on a roof) especially if of wood, are a great handicap to the firemen. All signs should be built of incombustible material and be so located that firemen may get under them so as to gain access to the roof.

SILAX—See Cork, agglomerated; also Talc.

SILESITE—An explosive compound.

SILICA—An oxygen compound, or oxide of a substance called silicon. No fire hazard.

SILICATE OF SODA is the sodium salt of silicic acid. It is used as a sizing to render fabrics, paper, wood, etc., fireproof; also used as a mordant for aniline colors. Sometimes called soluble glass. No fire hazard.

SILICON TETRACHLORIDE generates intense heat when mixed with cold water.

SILICON TETRAFLUORIDE generates intense heat when mixed with cold water.

SILICATES—See Silicic Acid.

SILICIC ACID—Sometimes called Silica. Silicic acid unites with potash and soda and lime-forming bodies called silicates. No fire hazard.

SILICON—Is not a metal, but a very hard substance resembling carbon in appearance.

SILK is the least dangerous of all the fibres and is not subject to spontaneous ignition excepting from the action of some dyeing or loading chemical. The loading materials are deposited irregularly on the silk fibres and if a portion of them become rubbed off and accumulate on some part of the mass, spontaneous ignition may occur at that point. The demand for natural silk having outgrown the supply, manufacturers have produced a silk substitute which looks almost like the real thing. Artificial silk is no more dangerous than natural silk unless it has been produced from nitrocellulose.

SILK (ARTIFICIAL) is cellulose fibre artificially prepared from suitable solutions of cellulose by forcing the liquid through fine orifices and coagulating the cellulose

as it emerges in the form of a delicate thread. Artificial silk resembles true silk very closely, in general appearance possessing even a higher lustre than the latter. It is not as strong or durable as true silk and its strength is greatly lessened when wet with water. One variety is made from wood-pulp. See Silk (raw).

SILK (BROAD) is woven piece silk. It is wound, reeled, woven and "quilled." Weavers use benzine for removing spots. It comes in widths measuring 36-50 inches. Silks less than these widths are known in the trade as "ribbons."

SILK CONDITIONING—Practically the same as wool finishing. Mild hazard.

SILK DYEING—Use acetic, sulphuric, muriatic and tannic acids, bicarbonate of soda, bichromate of potash, nitrate of soda, aniline colors and bicarbonate of potash. Nitrate of iron is used in black dyes. Where goods are sold by weight, gambia is usually used. Silk is bleached with sulphide of soda. Good insurance risks.

SILK FINISHING—Process consists of cutting, rolling, calendering, singeing, rubbing, straightening, steaming, cleaning, spraying and stretching. Good insurance risks.

Silk Finishing Compound—A secret mixture, said to contain potato flour, glycerine, glue and soap.

SILK FLOSS—A vegetable fibre from the Kapoc trees of the Dutch Indies, used in mattresses, etc. See Kapoc.

SILK-GUT—Derived from the silkworm; similar to catgut; used on ends of fish-hooks.

SILK NECKTIES are sometimes cut on boards similar to cutting boards in shoe factories. The hazards include cutting boards; also singeing with gas flame.

SILK NOILS—The short fibres or waste silk from mills.

SILK PLUSH—The cop yarn is received in skeins from the mills and is woven by the local mills. In silk and plush works, it forms the strands for the warp and filling for the backing of plush goods. The plush or piling is made of silk, cotton and mohair threads woven into a single strand.

Plush is made on a weaving loom similar to a silk loom with the exception that two backings are used between which is woven the silk piling for the plush. As the woven piece

leaves the loom a rapidly moving knife cuts the piling which leaves two pieces of plush.

"Striking out" machines, "tigers," and "brushes" are then used. These are similar in design with the exception that the wires forming the comb are heavier for the first process. These machines consist of a wooden roller spiked with wire combs over which the goods pass. They are employed to remove any loose piling and to whip it up. The "tigers" tear out most of the loose stuff, which is found on the floor. As this loose material is silk the hazard is light. Very little lint is made.

The "Nellies" is next employed. This machine is a four-sided wooden frame in upright position. At the bottom, a wooden roller with light wire comb; at top a similar roller with bristles. The wet plush is wound on a centre roller, the upper roller being turned by hand. As it turns an employee "batters" the plush to open up the piling. It is then dried.

At the "striking out" machine, the plush is attached to a strip of cambric which is first drawn over the rollers and brushes so that as soon as the machine is started the end of the plush will be combed. At this machine the material is first steamed to soften the texture. The cambric cloths are dried in a dryer similar to a laundry drier. Silk is woven on a single loom. Winders and spoolers are similar to those in knitting mills. Dyeing is a wet process; aniline colors, muriatic acid, bichromate of potash and nitrate of soda being used. The class is a fair one to insure. See Plush.

SILK (RAW)—Silk as it comes from the cocoon. It is spun into threads, skeined, wrapped in bundles called "books," in colored or white tissue paper (tissue should be white, as colored paper will streak the silk if wet), baled and wrapped in matting for shipment. It is tested for elasticity, strength of thread, quantity of natural gum, weave and twist. Moisture causes mildew. Water and smoke do not seriously affect its quality unless the smoke contains chemical agents which will eat the fibre. Mildew and discoloration by smoke or water can be removed by boiling, as in any event, it must be boiled in water to remove the natural gum before it can be dyed. The loss would be practically the cost of labor

for re-boiling, drying and re-reeling. A good salvage may be expected in most cases. Raw silk does not support combustion. It smolders, but burns only upon the application of fire. It is sometimes wrapped in heavy paper covered with burlap and is usually kept in the basement which gives it the slight dampness required for ideal storage. It is hard to ignite and burns very slowly. Ordinary smoke has little effect on this stock. It will stand considerable water, with practically no damage, especially if water is clean and stock is quickly dried. Considered good insurance.

Silks are "loaded" or "weighted" with tin, sugar and other materials. It is claimed to make the silk firmer and cheaper without lowering the quality. Silks are sometimes 40 to 60 per cent tin. The raw silk is first boiled to remove the natural gum of the silkworm. About 4 ounces in weight is lost in every 16 ounces boiled. It is "dyed to a certain weight," according to the purpose for which the silk is to be used. If silk is dyed to 14 ounces it means that 2 ounces of the lost weight is made up in loading and 14 ounces returned to the dealer in place of the original 16. The tin, in very minute particles, is added during the dyeing process. **"Weighting"**—This process adds on an average of seven-tenths of a pound to 100 pounds of dyed goods.

Silks of cheap texture may contain considerable cotton, and if wet, every color is liable to run.

SILK RIBBON SIZING—A process has been introduced in connection with the manufacture of ribbons, which introduces large quantities of naphtha, all of which is handled in a non-standard manner.

The naphtha is pumped from the yard to a laboratory by means of "Bowser" pumps which are open in laboratory. The naphtha is then placed in iron tubs where the "sizing" is mixed. These tubs are provided with iron covers and are held open by fusible link attachments. The mixture is drawn from the tubs, through ordinary faucets, to the sizing room, where it is placed in the open tanks (capacity about 5 gallons) of "sizing" machines. The ribbons are padded through machines and are dried over steam-heated rolls.

This room is ventilated by means of an electrically oper-

ated suction fan, which discharges through the roof, the pipe terminating about three feet above roof. The vent opening should be at floor level.

The cleaning and drying department sometimes adjoins the "sizing" department and here the naphtha should be handled in safety cans. The ribbons are hung on open racks and are dried by air which is piped along floor, there being slots in piping under drying racks which direct the air current against the stock. The air is furnished by an electrically-operated blower.

After the naphtha has been used, it is allowed to run back into a tank, underground, outside of building. From this tank it is pumped to laboratory, where it is reclaimed in a steam-heated "still." After it has been cleaned of impurities it is allowed to run back to tanks, after which it is again pumped to laboratory for further use. The residue and sediment from "still" is barreled and is often stored open on the floor of laboratory until called for.

The entire process and method used are of a very hazardous nature and buildings should be isolated by bricking up all communications between them and the main buildings, and all windows over the roof of these buildings should be bricked up for a height of thirty feet, the remaining windows being protected by standard fire shutters or wire glass windows in hollow metal frames.

The very strictest care should be given in the handling of the naphtha, and all entrances to buildings should be from the outside. A very dangerous process. Fire or explosions may occur from open gas flames and static electricity. Fires have occurred in naphtha sizing machines from static electricity generated at the glass rods or guides over which the silk passes. S. T. Skirrow.

SILK, SPUN or "SCHAPPE" SILK is the silk yarn spun from cocoon waste (fibres from pierced cocoons) or from waste made by throwsters. Carded and spun the same as cotton yarn. Fair insurance.

SILK (THROWN)—Raw or dyed silk that has been

thrown or doubled ready for the weaver. It has more than one strand. Good insurance stock.

SILK VELVET generally suffers very little from water damage if immediately salvaged.

SILK (WASTE) is prepared for the weavers and spinners as follows: It is put through "lappers," "fillers or combers," "dressing frames," "spreaders," "cards," "pomers" and "flossing machines." The poor pieces of silk are easily detected by means of strong electric lights under glass top tables, and are picked out by hand. Slow-speed machinery is used but lint covered journals result. Steam jets are used to keep down the lint and prevent a dusty atmosphere in the work rooms. See Silk Noils.

SILK (WATERPROOFING)—The silk is first sponged with dilute mixture of sulphate of alumina, then with a solution of soap made of light-colored resin and crystallized carbonate of soda and water. The soap thus formed is separated by adding common salt. The soap is dissolved in boiling water and the silk rinsed in same. Accommodation business.

SILK (WILD) is divided commercially into three classes: true silk, wild silk and artificial silk. Wild silk is the fibre obtained from numerous wild varieties of silk-producing moths.

SILK WIPING CLOTHS—These are used for wiping oily machinery and are not liable to heat spontaneously. They are therefore preferable to cotton waste or cloth.

SILK YARN AND FLOSS DYERS—Use sulphuric, nitric and acetic acids, also caustic soda. Hazards of dry rooms, silk pickers and centrifugal extractors. Fair insurance risks.

SILLS for fire doors (usually concrete or iron frames) should be raised at least 1½ inches above the floor and set entirely under the fire doors. These sills prevent water running from one section to another.

SILO MATERIAL—For spontaneous combustion feature see Hay.

SILVERING—See Mirror Backing.

SILVER-PLATED WARE—Hazards are heavy and light machine shop work, with drop hammers, rollers, hydraulic

presses, plating, buffing, pitch-heating, forging, soldering, burnishing, engraving, lacquering, making lead, copper and plaster moulds. Good insurance risks if lacquering properly safeguarded.

SILVER PLATING—Solutions of silver cyanide and potassium cyanide are usually employed. Fair insurance risks. See Electro-plating.

SILVER REFINERIES—See Gold Refineries.

SILVERSMITHS—For cementing handles on sticks, use carnauba wax or a mixture of yellow ochre and resin, or a mixture of resin, pitch and lime. Direct fire heat used. Good fire record class. See Goldsmiths; also Plating.

SINGEING—Leveling of a surface by removing a nap or fuzz. Ordinarily done with a light flame from gas or oil, but at times done by shearing. Arrangement of flame process a serious hazard.

SISAL—A tough, strong fibre grown in Mexico. It is used in making binders' twine. It is more easily wet than cotton. If in wet bales, it soon begins to heat, and after a period of several weeks, spontaneous combustion will take place. It burns rapidly but does not smolder, but if the bales are broken, the fire will burn most rapidly. It is much less liable to spontaneous combustion than the soft fibres of jute, hemp, tow and flax, and also hay; but it burns just as rapidly as these with the possible exception of hay. See Fibres.

SIZE—Used by painters, can be made of china clay, tallow and chloride of zinc.

SKATE—A term used in the insurance business when speaking of a very undesirable risk. (Eugene Eagles.)

SKATING RINKS—If built of frame or ordinary brick construction, are avoided by most insurance companies. Heating and refrigerating apparatus should be in cut-off section. As they are "season" occupancies, the moral hazard is an important consideration.

SKELETON CONSTRUCTION—A term applying to a simple framework of columns and beams whose efficiency is dependent largely on the existence of exterior walls and partitions which brace the building and hold the framework in position, just as the utility of the human skeleton is depend-

ent on the covering of sinews and muscles that hold the component parts together. On the other hand, the light framework of an ordinary wire cage bound into one compact unit is suggestive of an inherent strength and elastic persistence that renders any covering an incident rather than a necessity. (J. F. Kendall.) See Cage Construction.

SKETCH—An inspector will find that a rough sketch of a new device or of an intricate piece of machinery or equipment will be of great help to the underwriter or examiner in the home office in passing a line. It has been said that a "picture" tells the story ten times quicker than the written or spoken word.

SKEWBACK—The inclined stone from which an arch springs. The protecting tile from the web to the lower flange of a beam or girder.

SKIDS—Stock of a susceptible nature should be raised at least six inches from the floor so as to prevent water damage.

SKINS are obtained from calves, sheep, goats, etc. See Hides.

SKIRTED WOOLEN RAGS—Are pieces of woolen clothing from which has been stripped the cotton lining and cotton padding. It is made into clippings by cutting away the seams, button holes, etc.

SKIVING—Removing thin shavings from the flesh side of skins. See Hides.

SKYLIGHTS (Requirements)—If over main building or extensions, most rating bureaus require ½" ordinary glass, or wired glass in metal frames or thin glass on metal frame with a standard screen above. If over an enclosed shaft the skylight must be thin glass on metal frame with a standard wire screen above the glass. (See illustration, page 603.)

SLAG—The dross left in the process of refining metals. Also a compound of silica with metals, lime and clay.

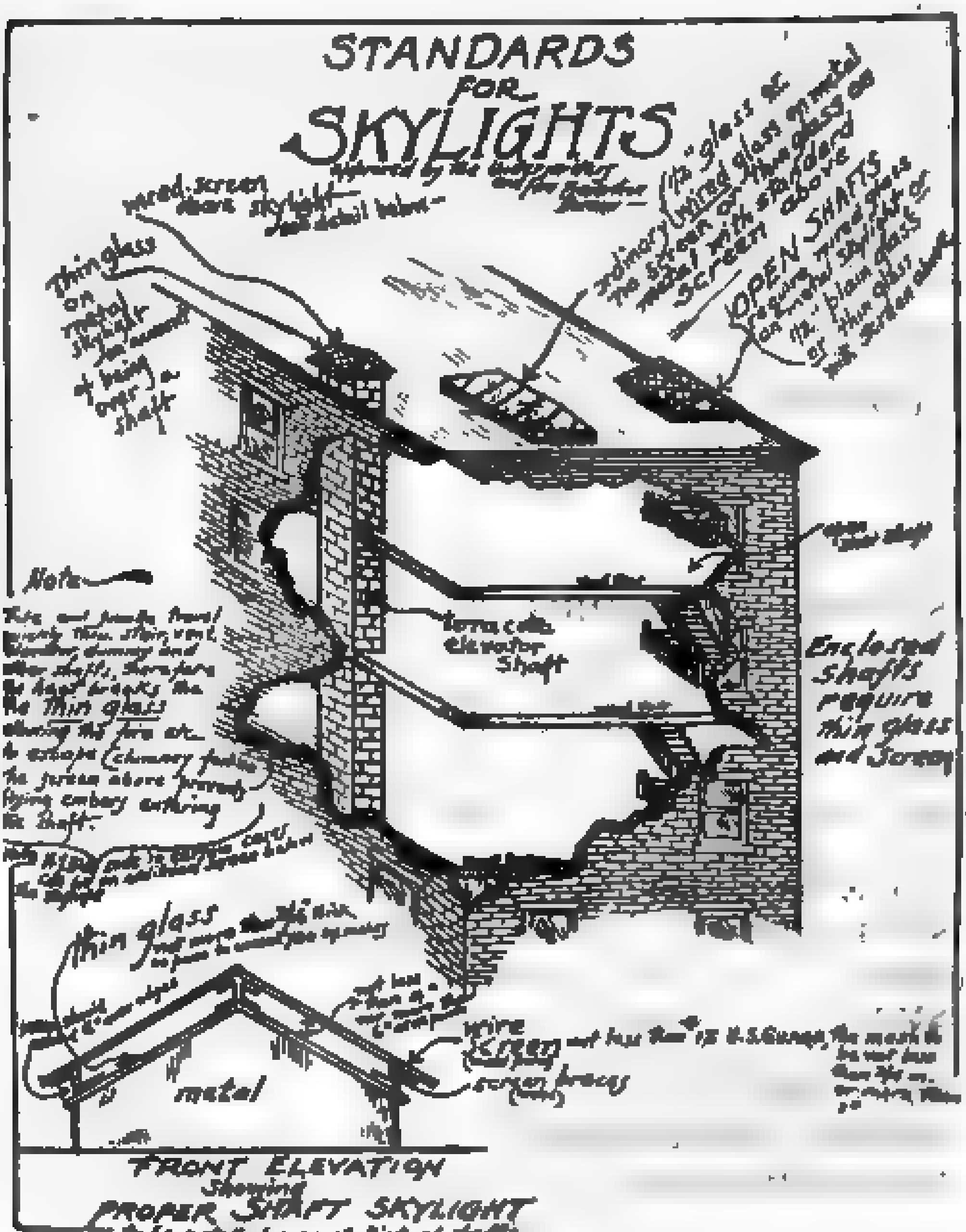
SLAG ROOF—A covering of slag spread over tar or a composition.

SLAM—The refuse from alum works.

SLATE (ARTIFICIAL) is formed of clay which has been hardened under pressure and heat.

SLATE ROOFS are a source of danger in case of fire on :count of pieces dropping on the firemen.

SLEEPER—A strip of wood about 2" x 4" embedded in



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'ches of fireproof construction and to which the top floor- g is nailed.

SLEEVE—*See Thimble.*

SLIP—The water lost in the delivery of pump due to leakage past piston, and too much clearance between piston and cylinder.

SLIP—At ferry houses is the place where ferryboats enter. It is "U" shaped, constructed of wood planks on heavy timbers and pilings. Planks are coated with grease to reduce friction when boats enter slip. They deteriorate rapidly owing to constant pressures from boats, ice congestion and the weather, and are apt to catch fire by sparks from locomotives, steamboats, matches, cigarettes and friction of boat entering piers. Slips can be counted on for a serious loss on account of being all frame and grease coated. Usually written in connection with ferry houses and railroad terminals.

SLIPPERS (carpet and cloth) are usually made from small pieces or "tag ends" of carpet or cloth. The inner sole is pasted and the outer sole tacked on the upper. Cold paste or glue is used. Shops employ cheap labor and are usually untidy. A class avoided by most underwriters.

SLIPPER TRIMMINGS—Stock consists of skived leather, laces, buckram felt tops, metal ornaments and embroidery. Concerns usually give the sewing to "home workers," who do it as piecework. Shopwork consists of making lead buttons, metal working, enameling metal parts, cementing linings with rubber cement, sewing, embroidering and skiving leather. Poor insurance risks.

SLOW BURNING—See Mill Construction.

SLUBBING—Twisting by machinery in preparation for spinning, as in a cotton mill.

SMALT—A powdered blue glass, colored with cobalt. Used by sign painters.

SMELTERS—See Refiners.

SMOKE EXPLOSIONS—See Back Draughts.

SMOKE-HOUSES should be built of incombustible material with a vent to the outer air. The doors should be at least three-sixteenths inch iron, with angle-iron reinforcements to prevent the doors from buckling. The hanging racks and grating over the fire should be of iron. The meat is suspended from racks, and the lower grate is to prevent the meat from falling into the fire. Sills should be raised six

inches. If possible, smoke-houses should be in a detached structure. Steam jets are sometimes used to extinguish fires in these compartments. The fires used for smoking may be of sawdust, beech shavings, hickory wood, charcoal. These fires are either built directly on the floor or are placed in earthenware pots. The entire interior of the smoke compartments becomes in time thickly coated with a black, greasy covering from the grease-laden fumes from meats or fish. The fire record of the non-standard type of "inside" smoke house is poor. See Provisions.

SMOKELESS POWDER consists of purified nitro-lignum, mixed with nitrates other than nitrate of lead.

SMOKEPIPES must not be nearer than 18 inches to any lath-and-plaster or board partition, ceiling or any woodwork, nor shall they pass through any wood floor, partition, or roof. Smokepipes of furnaces, laundry stoves, large cooking ranges, etc., shall be not less than 18 inches from woodwork unless guarded by shields; then not less than 9 inches.

SMOKING—The National Board records for 1916 state that careless smokers caused a total loss of $4,505,963 in the United States. In Philadelphia 413 fires are credited to smokers. It should be made a penal offense to throw away a burning cigar or cigarette in or about any building, structure or car, or where it may ignite any inflammable material. In New York City a specific charge of five cents per $100 per annum is applied to sprinkler risks, and is removable upon the proper posting of "No smoking" signs. In garment manufacturing establishments a charge of 25 cents is made, at present, removable only after a series of unannounced inspections covering a period of six months. Because of the class of labor employed in this kind of business, this requirement becomes necessary to absolutely assure the bureau that all smoking has been stopped. In garages a charge of 25 cents is applied, which is added upon the recommendation of the New York Board of Fire Underwriters, and is removable upon the installation of proper signs. For theatres, 10 cents is added if smoking, by other than the actors *during the play,* is allowed. (S. T. Skirrow, in "The

Weekly Underwriter.") See Lodge Rooms, Furnished Rooms, Dance Halls and Stables. See Matches.

SNAP FASTENERS—A machine-shop hazard. Machinery consists of die presses, drills, lathes, emery wheels, milling machines, blowpipes and annealers. Cleaning with acid and japanning are the main features to be noted.

SNOWFALLS (fire danger of)—In Northern climates, heavy snowfalls which remain on the roofs of houses are apt to cause the roof to sag and crack the chimney. Snow should be cleaned off roofs.

SNUFF MANUFACTURING—The lower leaves of the tobacco plant come to the factory in hogsheads. After ageing in the factory warehouse for a few years the leaf is coarsely cut up, "ordered," and reprised back in the hogsheads to sweat or ferment. It is then ready for desiccation and pulverizing. It is toasted in a furnace dryer or toaster (which is an iron cylinder revolving in a breeching of brick, in which are heating fires), or shaken in a series of trays in a room heated by steam to a high temperature. The toasted flake is ground or pulverized in machines termed "mulls" and the snuff cleaned in a bolting reel and packed. The principal hazards are toasting, grinding and cleaning; kettles for heating water, salt and licorice; labeling and lacquering the inside of boxes; dry-rooms are the incidental features to be noted. Fair insurance risks.—Ira G. Hoagland.

SOAP FACTORIES—The hazards of the usual modern soap factory are not very bad, as the entire process is by steam heat. The rendering of fats is usually carried on in a special plant for this purpose. There may be glycerine evaporators (steam-heated), stearic acid making, refrigerating machinery for cold-storage rooms. The oils used are palm, olive, fish, whale, rape, cottonseed, cocoanut and corn. The alkalis, soda, bicarbonate of soda, soda ash, carbonate of potash, caustic soda. Soap making is mainly a boiling process. "Crutching" is mixing the soap in an agitator kettle with coloring matter, perfumes, etc. When soap rises to the surface of the kettle, it is skimmed off and run into "frames" to cool. A "frame" is a rectangular metal box on wheels, with detachable sides and ends. When the soap

ools, the sides and ends of the frames are removed. The lab of soap is cut by vertical wires protruding through a lat bed on which is placed the soap. Quick hard burning isks. Liable to be a serious exposure to adjoining properies. Fair fire record. See Shaving Soap.

SOAP POWDER and Dressings for Textile Workers—Manufacturers use lactic acid, corn-syrup, gluten, tallow, geltine, sugar, boric acid, formic acid, carbon tetrachloride, aqua ammonia and chalk. Hazard that of a soap factory, including chemical laboratory with usual chemicals, such as ether, ethyl alcohol, tinchloride, nitrate of soda, and caustic soda in small bottles. Other soap powders are generally made from absolutely dry chip soaps, ground into a fine powder.

SOCIAL CLUBS—See Clubs.

SODA—The commercial term applied to bicarbonate of soda.

SODA, ALUMINATE—Salt used by calico printers as a mordant.

SODA AND ACID EXTINGUISHER—See Chemical Fire Extinguisher. See illustration, page 699.

SODA ASH—See Sodium Carbonate.

SODA WATER SIPHONS are sometimes charged up to 60 pounds pressure and have been known to explode with great violence.

SODAMIDE explodes in contact with water.

SODIUM is made from caustic soda by electrolysis. It is not inflammable, but its presence increases the intensity of a fire. See Water.

SODIUM BISULPHITE—A chemical, not dangerous. Used in bleaching and as a disinfectant. Not inflammable.

SODIUM CARBONATE—Called soda ash and is used for cleaning purposes, scouring wool and in the manufacture of soap. No fire hazard.

SODIUM CHLORATE is dangerous on account of its capacity for liberating oxygen.

SODIUM CHLORIDE is common salt.

SODIUM HYDRATE—Called caustic soda, and is used in *soap making.*

SODIUM NITRATE—A yellowish white salt, and a great oxidizer. When mixed with organic matter it will ignite.

SODIUM PEROXIDE—A white or yellow powder. A strong oxidizer. When in contact with organic matter will cause fire. If moist will generate heat. Used for bleaching straw or woolen goods.

SODIUM PHENATE is carbolic acid dissolved in caustic soda. It is sometimes used in gas masks to neutralize the poison gas, such as phosgene, tear gas and chlorine. It is apt to destroy fabric of mask and on account of its being strongly caustic, it is apt to burn the faces of those wearing them. Such difficulty has been overcome by making cloth of two layers of flannelette instead of one layer of flannel. This keeps the fabric moist and prevents the caustic from exerting its corrosive action. Sodium Sulphenate is used the same as sodium phenate.

SODIUM SULPHIDE—Used in tanning leather. No fire hazard.

SODIUM TUNGSTATE—See Fire-Resistive Solutions.

SOFFIT—The lower or underneath surface of an arch.

SOFT COAL—See Coal.

SOFT WOODS—See Lumber.

SOLDER—Usually composed of lead and zinc.

SOLDERING IRON FURNACES (usually called mufflers) should be set on 6" legs and gas supply pipe should be rigid iron. Irons should be used on metal covered tables. Portable charcoal pots should be used only in the open.

SOLE TENANT RISK—One having but one tenant. An allowance is usually given in the rate for this feature. Considered much more desirable than risks of multiple occupancy.

SOLIDIFIED ALCOHOL consists of wood alcohol which has been colloided to a soft semi-transparent mass with nitrocellulose or soap. Gives off inflammable vapors at about 50 deg. F. See Alcohol.

SOLUBLE BLUE is apt to cause fires in color works through friction and spontaneous combustion. See Chromes.

SOLUBLE COTTON—See Nitrocellulose.

SOLUBLE GLASS is silicate of soda.

SOLVENTINE—Used as a varnish. Has a low flash and e test. Composed of low-grade varnish, linseed oil and nzine or its equivalent. Cotton waste, saturated with Solntine will ignite spontaneously.

SOLVENT NAPHTHA—See Benzine.

SOLVENTS are likely to include inflammable liquids conning such substances as acetone, ether or naphtha.

SONOCA—A substitute turpentine, used on O'Cedar mops.

SOOT—Mostly carbon. It is made up of little particles ich are thrown off from the burning wood and lodge on chimney sides.

Soot, How to Remove—Large numbers of shingle roof d defective flue fires are being reported, due to the inasing use of soft coal. The accumulations of soot on ating surfaces reduce the value of the fuel, and frequently g the flues and start fires. Joseph Harrington, Administive Engineer for the United States Fuel Administration ated in Chicago, suggests the following plan for removal soot: The fire is put into good condition with a substanl body of hot fuel. Common salt, thoroughly dried, is en thrown or sprinkled onto the incandescent fuel bed in a antity depending entirely on the size of the furnace. In e case of a house heating furnace, one pound at a time is iple; in the case of a large power plant boiler, four or five oops full may be required. The dampers are kept open so to maintain the furnace temperature and the salt is alved to remain until the fumes have entirely disappeared. Immediately upon charging the salt, the furnace becomes ed with dense white fumes which may require as much as lf an hour to entirely disappear. If results are not sered on the first application, it should be repeated as many nes as necessary.

Once the heating surface is thoroughly cleaned a small apcation every few days is usually sufficient to keep it so.

Everyone using soft coal is urged by the administration use this remarkably simple and cheap process for getting of the soot, cleaning and heating surfaces of boilers, thus ving large amounts of coal, preventing fires from chimneys

and generally conserving all along the line of heating and the production of power.

SORGHUM—A grass fibre.

SOUND VALUE—The actual value at the time of fire after depreciation has been deducted. The terms "market value," "cost price," etc., as sometimes used, are misleading. See Actual Cash Value.

SOURCE OF SUPPLY—See Water Mains.

SOYA BEAN OIL—A vegetable oil used in making soap, putty and as fuel.

SPALL—To chip or flake off. Stone or brick or other masonry walls spall after being heated and subjected to hose streams. Underwriters usually give special consideration to buildings having walls likely to spall, and reduce their liability accordingly. See Platforms.

SPAN—The space between the iron beams, as for instance, the terra-cotta arches are spanned 5 feet on centers.

SPANISH BLACK or cork black is made from burning cork.

SPANISH MOSS—Used in upholstering; will ignite spontaneously.

SPANISH WHITE—Same as whiting.

SPARK ARRESTER—Used on foundry cupolas, chimneys, etc., to catch sparks and prevent them from flying and igniting shingle roofs. Made of wire netting and built like a cage over the top of the stack.

SPECIAL BUILDING SIGNAL is a manual device requiring some one to pull the lever which sends in the alarm. See Manual Alarm. See Alarm. See illustration, page 736.

SPECIAL FORMS OF INSURANCE require special consideration as hardly two cases are similar. Most companies employ an expert who is familiar with these lines of coverage. See Use and Occupancy, Accrued Charges, Leases, Profits, Rents, Legal Liability, Improvements.

SPECIAL HAZARDS are the fire dangers incident to manufacturing plants in their process of work. See Hazard; *also Risk.*

SPECIAL SPIRITS—Trade name for a substitute turpentine.

SPECIFIC GRAVITY OR DENSITY plays an important part in the engineering end of fire insurance, in that it points out the connection between weight and bulk. The specific gravity of the liquid is its weight in proportion to the same bulk of water. Example: A bottle which holds 1000 grains of water will only hold 830 grains of spirits of wine, which shows the comparison of weight under the same bulk. The density of the liquids containing alcohol is used by the excise to determine the amount of alcohol they contain.—W. D. Grier.

SPECIFIC RATES—Those properties subject to a special rate by a central rating board or bureau by reason of an occupancy more hazardous than called for under a minimum rating. See Rates.

SPECIFIC WEIGHTS—See Specific Gravity.

SPECTROSCOPE—A new device for determining the amount of gasoline mixed with air. It consists of a sort of prism lights which throw rays similar to a rainbow. If the rays are light, no gasoline is present. If rays are of different colors, those acquainted with this new invention know immediately the amount of gasoline the mixture contains according to its color. They are supplied with a vent pipe and are generally installed at the bottom of elevator shafts or sump pits in a garage.

SPERMACETI—A solid wax taken from the head of the sperm whale. Melts 110 to 120 deg. F.

SPHINCTER HOSE—Rubber or other hose wound with wire. Prevents wear and tear and gives added strength to hose.

SPICE MILLS—The principal hazard is grinding. If the spices are ground wet, the hazard is mild. If they are ground dry, the grinder should be in a separate fireproof room and be equipped with magnets. Burr mills are often used. Additional hazards are found at the sifters, bolters, and dryers where considerable dust abounds. Whole spices are not very susceptible to moderate smoke damage. Usually imported in burlap bags. Spice mills burn with heavy dark

smoke and are liable to cause damage to susceptible stocks in immediate neighborhood. Considered by most companies as an unprofitable class of insurance.

SPINDLE CARVER—A small cutter rotated at the end of a horizontal spindle.

SPIRIT, METHYLATED—Used as a solvent for resins in the manufacture of varnish. Composed of alcohol and a small amount of wood-spirit.

SPIRIT VARNISHES—Usually consist of resinous substances such as copal, mastic and sandarack. Some of these varnishes contain alcohol, acetone or wood alcohol.

SPIRITS OF HARTSHORN—See Ammonia.

SPIRITS OF TURPENTINE—See Turpentine.

SPIRITS OF WINE—See Ardent Spirits.

SPITTOONS—See Cuspidor Hazard. See Sawdust Spittoons.

SPLINE—A rectangular piece of wood used to secure a joint by fitting into two grooves opposite each other, as a splined plank.

SPONGES—The best are grown in salt water where no sandy bottom abounds as the sand smothers the growing sponge. Sponges, when brought to the surface, are black and slimy and filled with water and animal matter called "gurry." Several days are required for the gurry to run off when the sponges are dead. They are squeezed out with the hands and strung on lengths of coarse twine. Sponges are bleached with dilute sulphuric acid and hyposulphite of soda and water, then washed in water and dried by artificial heat. Dirty or sooty water greatly lessens the value of sponges. Sponges, contrary to general belief, suffer a very severe water damage, and insurance should be written carefully.

SPONGING AND FINISHING CLOTH—Dullest season May, June, July, October and November. Busy season the same as in the clothing trade. Live steam generally used for sponging. Fair insurance risks.

SPONTANEOUS COMBUSTION—Porous substances absorb air, oxidation raises the temperature, which in turn *accelerates* oxidation with increasing rapidity until fire

ensues. The low conduction power of porous substances greatly facilitates combustion by preventing the dissipation of heat generated. When a house is being redecorated, the painters frequently use a wood polish containing raw linseed oil and turpentine. In one instance, a piece of waste with this oil was found smoldering in a workman's pocket and he did not know it until his attention was called to it. Polishing cloths about the home should not be placed in drawers of cupboards, but hung where air can circulate around them. Oily floors left when soap manufacturers, furriers and machine shops vacate buildings have caused spontaneous combustion when a new tenant has laid new floor over the oily one. Sawdust in ice houses and cold storage plants has been known to ignite spontaneously when moist. Soft coal piled in bulk and dampened will ignite spontaneously. Under certain circumstances flour, coal or an oiled rag catches fire without contact with anything hot. And this is the explanation:

The carbon, which is the principal constituent of flour, coal or oil combines with the oxygen in the air. It is a true chemical combination and, like most such combustions, produces heat. The heat encourages the process to become more rapid, thus increasing the heat, until the point is reached at which it bursts into flames. In connection with this process a few strange features have been observed, features that are difficult to explain. For instance, if the air be moist, the oxidation takes place more perfectly; seemingly moisture helps the oxidation. Again, if the substance oxidizing be in a closed or confined place, especially if this place be dark, the process is more certain. This seems contrary to what one would expect, but it is a fact that a greasy rag thrown into a dark corner of a closed closet is more likely to catch fire than if it be left in an open place.

Of course what seems like spontaneous combustion is not always spontaneous, but is caused by an electric spark igniting the already heated or oxidizing matter. That is why in flour mills, machine shops, coal storage bins and the bunkers of ships great care is necessary in having all electric connections in good order, for the tiniest spark

is often sufficient to start a conflagration. (S. T. Skirrow.) See Vegetable Oils. Oily Waste Cans.

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SPONTANEOUS COMBUSTION POINT—The point or temperature at which gases, vapors or solids will take *fire of their own* accord without being brought into contact

with burning or incandescent substances. See Flash Point.

SPONTANEOUS IGNITION—A term used in the insurance business to denote ignition produced in consequence of slow and gradual accumulation of heat from oxidation.

SPORTING GOODS—Hazards of repair shops with varnishing, hand woodworking, stock of gun-powder and cartridges, rubber cement, calcium carbide, automobile specialties, photo supplies. Considered good insurance if stock only and no repairing is done.

SPOT PROOFING—Some double texture cloths are given a treatment for the purpose of making them more water repellant. The exposed side of the fabric is given a coating of a solution of paraffine, alum, vaseline and naphtha. The hazard is of explosion by static electricity.

SPOTTING—Removing spots or stains from garments or cloth. Naphtha is generally used and same should be kept in a safety can.

SPREADERS—Are table-like structures for spreading a thin coat of rubber from the churns, upon the cloth, drying it and evaporating the naphtha or other volatiles used in the composition. As a rule most goods are run through a spreader two or more times, and only a little rubber is applied each time. The machine consists of a knife bearing on a roller over which the cloth passes, and a series of steam coils which the cloth also passes over, and a winding roll at the opposite end. Fires from spreaders are frequent on account of naphtha fumes and their likelihood of being ignited from static electricity which becomes generated by the friction of the cloth passing under the knife. Spreaders should be in a fireproof cut-off room. Machines should be well grounded, have a steam jet, and the air in this section kept humid. See Static Electricity.

SPRINGER—The lowest stone of an arch.

SPRINGS—A name given by manufacturers to rubber shoddy.

SPRINKLER EQUIPMENT (AUTOMATIC)—Briefly speaking, consists of iron piping filled with water or air, securely supported immediately beneath the floors, i. e., the *ceilings*. At intervals of eight to ten feet are attached

fusible plugs called sprinkler-heads having deflectors designed to spray water over the area desired. In the ordinary sprinkler a solder (solder of bismuth, tin, lead and cadmium) having a melting point of about 160 deg. F. is employed. The melting of this solder releases the disc from the valve-seat and the water is forced out under pressure through the orifice formerly closed by the valve-seat. The deflec-

Photo by Paul Thompson.

Distribution of Water by Automatic Sprinkler

tor causes the water to spray in all directions like rain, thus effectually wetting anything within the area which the sprinklers are designed to cover, which is 80 to 100 square feet.

Among the important questions to be considered after the design and probable occupancy have been considered is that *of heating*. It should be definitely determined that all portions of the building will be heated to about 40 deg. F. during

the winter. Unfortunately water will freeze at 32 deg. F. even when in pipes, a condition that some of those planning equipments must realize if a wet-pipe system of sprinklers is under consideration.—E. P. Boone.

The latter system is preferable for the following reasons: It costs less to install and to maintain and results in a slightly greater reduction in insurance rates. Example—A six story and basement ordinary brick building of 5,000 square feet without exceptional features and with a water supply consisting of a 10,000 gallon gravity tank and a 7,500 gallon pressure tank. The cost for the **wet system** could be roughly figured as $4,500 for the tanks and supports, plus $6,600 for the interior work consisting of piping, valves and fittings. This latter item is based on an approximate cost of $13 to $15 per head and allowing one head for each 80 square feet. The maintenance cost would be about $500 per annum and the insurance reduction 40 to 90 per cent.

The same equipment but **dry pipe** would increase the cost as follows:—Each 6-inch dry valve would cost about $600. The air compressor would cost about $500. Add to this the cost of enclosing the dry valve in a freeze proof room, unless it is located in a heated portion of the risk, about $150 for the ordinary wooden enclosure. Lighting and heating this enclosure including switchboard, wiring and steam line for heat would bring the additional cost to about $2,000 more than for a wet pipe system. The cost for yearly upkeep will be about $600 and the insurance reduction 40 to 85 per cent. These figures were those in effect August, 1919, and are merely given as a guide. In addition to these figures each system has peculiarities which add to the cost.

The great points of advantage which the automatic sprinklers possess over all other means of fire fighting are —they are on duty every hour of the day, and every day in the year. The heads which are opened are those located just where the fire is. The open heads can operate regardless of smoke or other conditions, which would make it difficult for men to reach the seat of the fire. Such protection can cover every nook and corner of a plant, and insure that

fire starting at any point will be almost instantly met with such a downpour of water as to either extinguish it entirely or hold it in check within a small area until the last vestige is extinguished by the fire department. See Alarm, Central Station, Coal Shortage, Curtain Boards, Dry Pipe Sprinklers, Dead Riser, Gate Valve, Gravity Supply, Hoops, Live Riser, Open Sprinklers, Pressure, Sprinkler and Heating System, Sypho-chemical Sprinklers, Tables, Valves, Staggered, Tell-tales.

SPRINKLER HEADS (Old Types)—In considering the possible service available from very old sprinklers one should bear in mind that during all the years they have remained in service apparently idle they really have been under a constant load continually doing work. Like faithful soldiers they are always on the "firing" line doing duty. The work of a sprinkler has been accomplished when it opens at a fire. Its real work is the continual resistance to the water pressure and the maintenance of an active tension within itself so that when heat releases the solder the sprinkler will immediately and fully open. This unique feature is peculiar to the work demanded of sprinklers. No other machine is expected to stand immovable under its full load for years without oiling or other care and prove fully efficient at a second's notice. It is a lack of consideration of these facts that leads us to expect sprinklers to last continually and be as effective after years of service as when new.

Sprinkler heads pay for themselves within a few years of service. All owners of equipments should treat them as any other machinery, renewing them when corroded, injured or old so that perfect efficiency may be maintained and the full benefit of the investment received in case of fire.

Most all common acid vapors, i. e., nitric, sulphuric, and muriatic, affect the sprinkler heads, as do other vapors which change the atmosphere to any extent from the normal. If wiping or brushing does not show the sprinkler to be clean and bright it is liable to be in danger, and heads in this condition should be tested from time to time. Solder can be tested with a point of a knife, it crumbling if unre-

liable, and curling as a chip if in good condition. Where there are corrosive vapors the sprinkler heads should be wax coated or have glass covers or otherwise protected.

SPRINKLERS are made to fuse as follows:

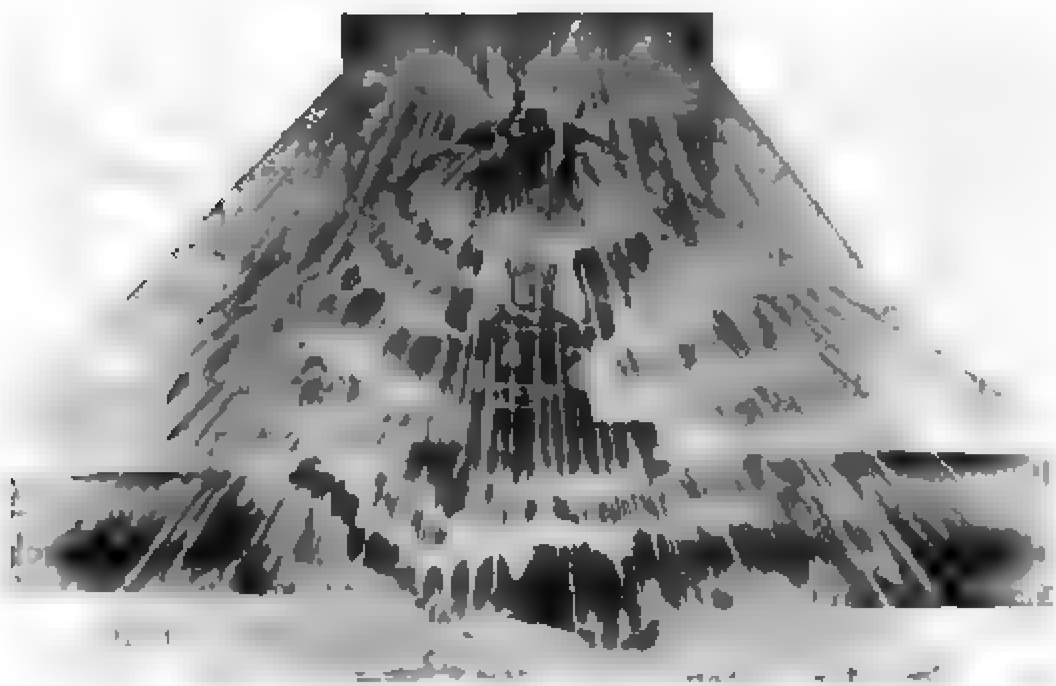
Without color except that of its composition, 160 deg. F.

Black-corro-proof to prevent corrosion, 160 deg. F.

White color, 212 deg. F. Blue, 286 deg. F. Red, 360 deg. F.

SPRINKLERS (test of) in cold storage. See Dry Pipe Sprinkler Equipment.

SPRINKLERS, QUESTIONABLE OCCUPANCIES—Automatic sprinklers in the following occupancies may not be expected to control a fire if it has a good start owing



Automatic Sprinkler Head in Operation

to the construction, processes involved, and the hazardous materials: Celluloid workers, cereal mills, cooperage plants, cork factories, cotton warehouses, grain elevators, flour mills, furniture factories, match factories, oilcloth works, rubber works, saw mills, starch factories, varnish works, window-shade factories, rough woodworking and sugar refineries, aluminum powder factories, chemical risks using substances which might explode or ignite from the applica-

tion of water, such as sodium. It can be readily seen that fires of a flash nature which might be expected in many of the above lines, or those where dust explosions are imminent, could spread a fire throughout an entire floor before sufficient heat would be confined in one place to operate a sprinkler head, or which might disrupt the sprinkler system.

SPRINKLERED RISKS IN ZERO WEATHER—Where sprinkler equipment has been drained or is known to be frozen, the following precautions should be exercised in placing the equipment in commission in order to avoid water damage and prolonged interruption of protection.

In order to prevent unnecessary annoyance and delay, it is suggested that the making of repairs be left with the company that installed the equipment.

Have equipment examined by competent party, the pipe system including filling and steam pipes for tanks tested for ice and leaks, and repairs effected where necessary.

Open all drain valves and remove plugs at low points to insure the pipe system being properly drained.

Close all controlling valves and fill tanks slowly one at a time.

Turn water slowly into system one floor at a time, after having closed all drain valves and replaced plugs at low points.

The following day if no leaks develop, place air on pressure tanks and notify central station company where such service obtains to restore alarm service.

Note.—The above precautions apply to both wet and dry pipe sprinkler systems.

Where sprinklers are in a pendant position it may be necessary to remove each sprinkler so located in order to test for ice, and in doing this extra care must be exercised not to injure the sprinklers. Those injured must be replaced with new sprinklers before placing equipment in commission. (N. Y. Fire Ins. Exchange.)

Upon the approach of winter, test all post indicator valves for proper drainage to prevent freezing. Open all valves that should be opened and ascertain if all pipes are free from sediment and ready for instant use. Box in and pack all

exposed piping, both water and steam, the latter so that there will be sufficient heat for building and for tank coils. Have extra sprinkler heads on hand for emergency.

Cold Weather Lines, i. e., branch lines in driveways, hallways, elevator shafts, coal holes and other unheated portions which are shut off during winter should be thoroughly examined in the spring to detect frozen or bursted pipes and imperfect valves. Upon the approach of warm weather the valves should be kept open.

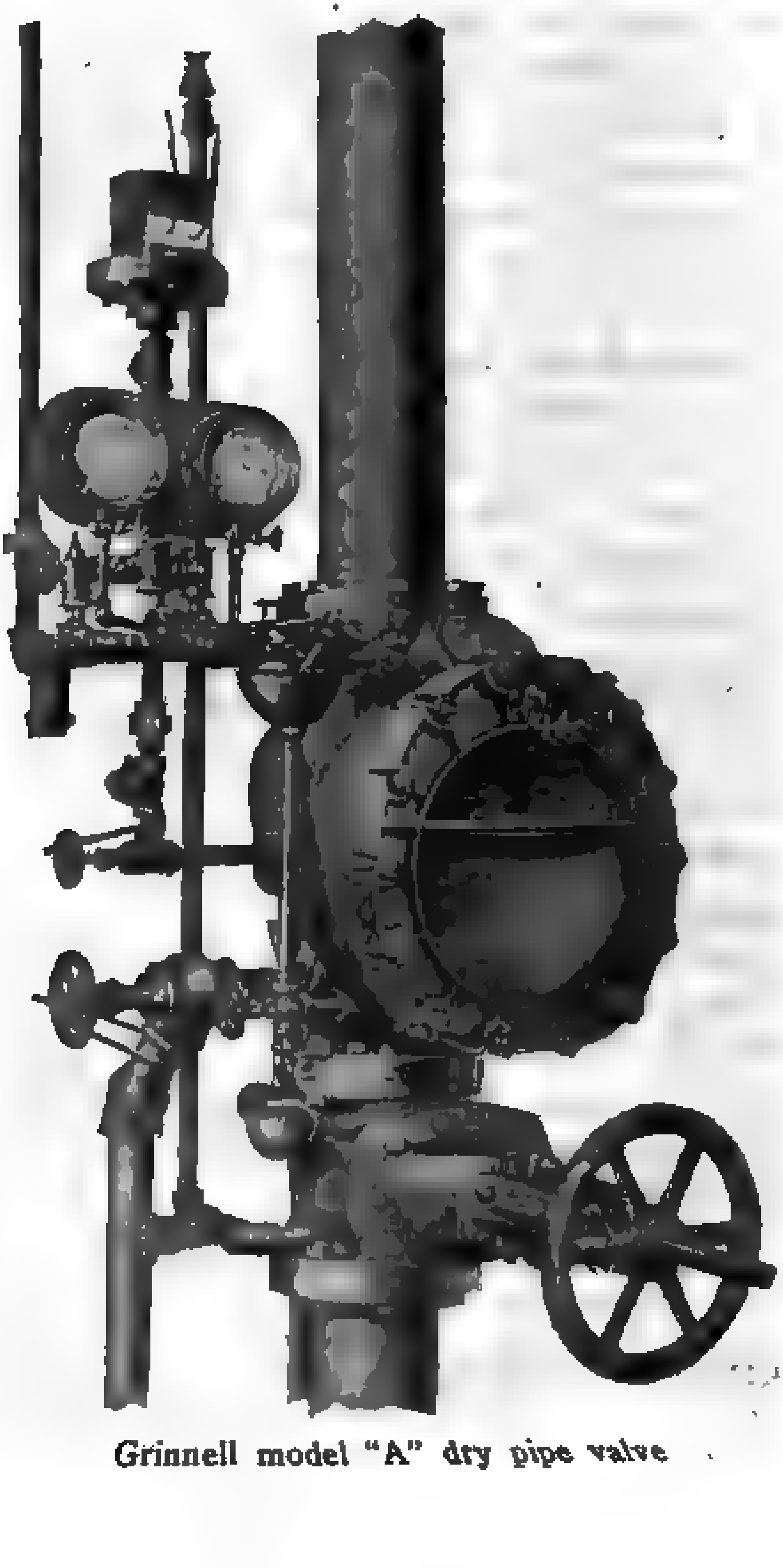
SPRINKLER DRY-PIPE should be controlled all year on approved dry-pipe valves rather than being "wet system" for eight months and "dry system" for four months. In changing from a dry system to a wet system there is an increased amount of sediment deposited in the pipes. The pipes are not always drained when cold weather sets in, and the dry valve is not always properly adjusted. All pipes should be pitched to properly drain so that water could not collect in them and freeze. See illustration, page 622.

SPRINKLER EQUIPMENT ON VESSELS—Statistics furnished by shipowners show that approximately 20 per cent of the ocean travel hazard is caused by fire or explosion. A large percentage of these losses could be overcome by the installation of an adequate automatic fire-fighting system. See Fires at Sea; also Ship Fire Prevention.

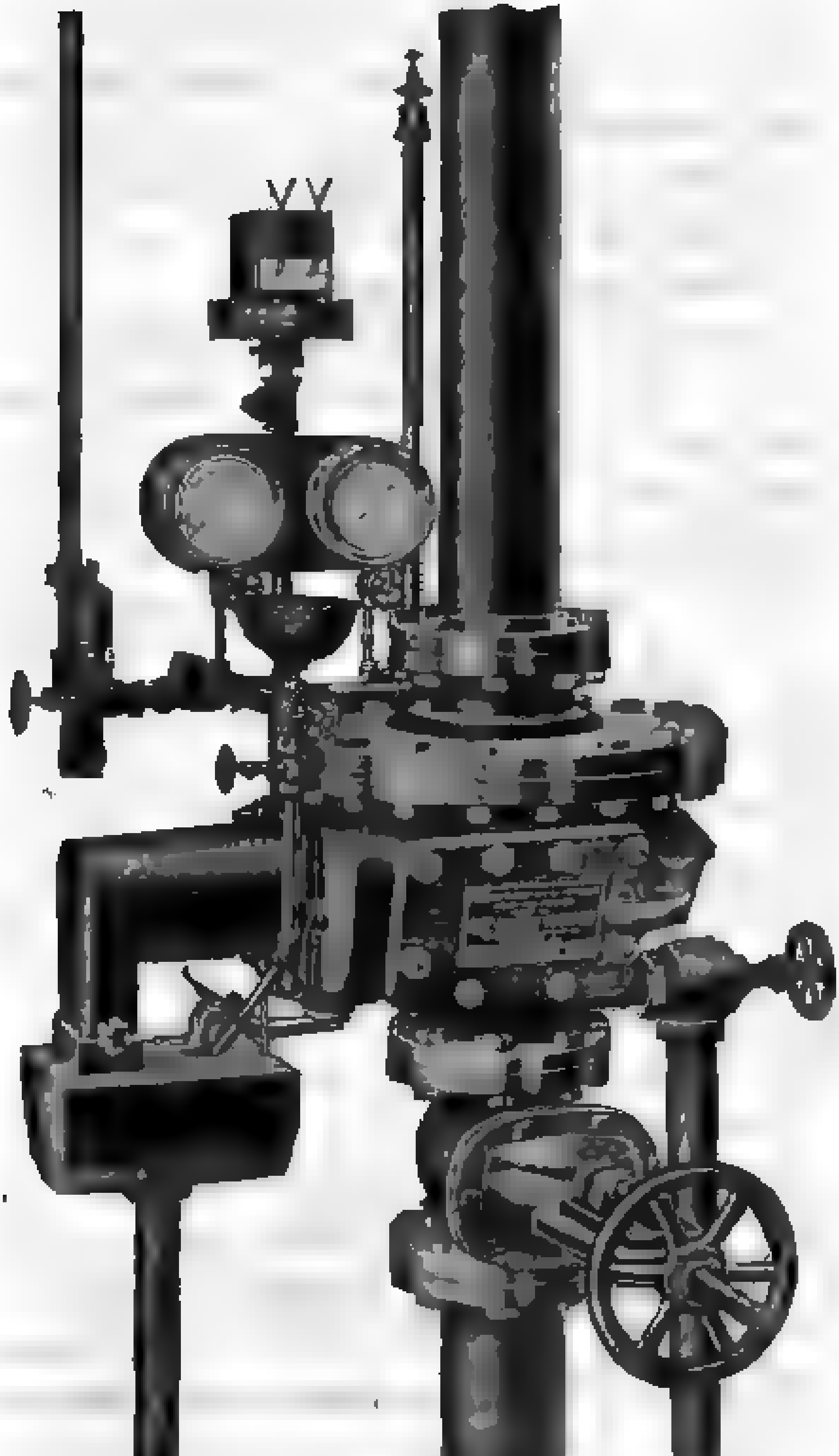
SPRINKLER FAILURES are due to allowing steam pressure to run down below minimum pressure over Sundays and holidays, inadequate electric power to drive fire pumps, shutting off water and then delaying repair work. Notify the insurance company when it is necessary to shut off water. When extensive repairs are necessary, provide additional fire pails, hose and watchmen. Put red tag (as used by Factory Mutuals) on closed valves.

Fires quite often occur in unsprinklered portions, or even in those parts where it seems impossible for a fire to originate; or just after the equipment has been shut off, or before its installation is complete.

SPRINKLER LEAKAGE is protection against loss or damage due to accidental discharge of water from the sprinkler *system or tanks* supplying same (including accident



Grinnell model "A" dry pipe valve



Grinnell model "B" dry pipe valve

caused by freezing). It does not protect against loss due to discharge of water when fire occurs nor for collapse of building unless the latter is caused by accidental leakage of water from automatic sprinkler system or the tanks supplying it. Penalties are imposed in rating for absence of floor control valves, lack of proper watchman service and (or) alarm service, wood tanks on wood trestle, tanks with flat hoops, concealed spaces and furring.

"It is claimed from experience that about 50 per cent of the losses are caused by the sprinkler head itself, 30 per cent of the losses being attributed to piping, including freeze-ups, and the remaining 20 per cent arise from the occasional but very severe losses which occur in connection with the collapse of the tanks or the eruption of a header or equivalent full volume of water supply. The main thing is, "What device have they on system to notify those in charge in case of a break in order to shut off the supply?"

Sprinkler Leakage—Some of the causes of tank collapse, precipitations and leakage for which the inspector should constantly look, are as follows:

1. Freezing; excessive pressure, settlement of tanks on risers, belts unguarded, near pipes; wearing out of packing on valves; defective castings; overloading floors; light castings and heavy pressure; neglect to drain and put on dry pipe valves; alternating systems in exposed places during winter months, which, if undiscovered, would result in the bursting of pipes.

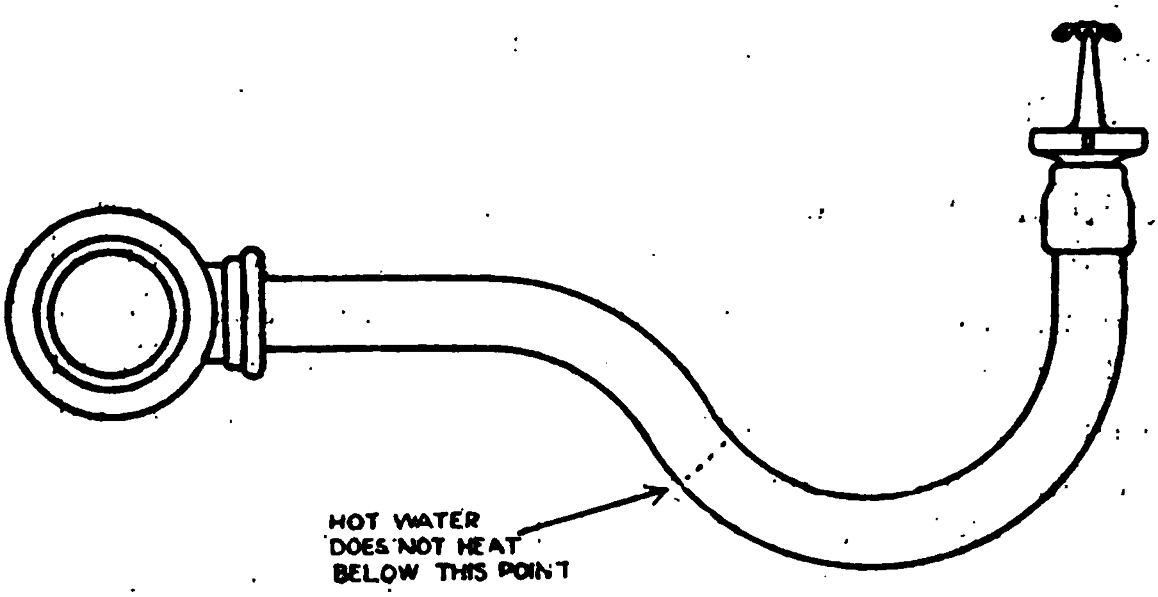
2. Sun's rays through skylight; pendant heads on dry systems in extremely cold climates from condensation of moisture; extraordinary heat and low-degree heads; belts unguarded near heads; chemical action on pipes and heads; disintegration of fusing material on old heads; carelessness of employees handling stock, hanging or leaning things on or against pipes; leaving open in cold weather windows, doors, ventilators, hatchways, monitors and other openings, which, if undiscovered, would result in the discharge of heads.

3. Use of timber, which, if exposed, is unduly subject to rot; filling tanks before concrete or masonry is thoroughly

dried to the core; neglect of tanks and supports, resulting in rot, rust, corrosion and decay; defects in casting or rolling of metal supports; constant vibration or jarring of building; inadequate supports; inadequate size of bearing plates under tank supports; crumbling of cement or mortar; flat hoops; faulty construction; heating water in tanks to too high temperature; using old buildings without consulting architects as to carrying strength and builders as to condition of building; overloading floors, which if undiscovered would result in the collapse of tanks.

4. Carelessness in maintenance of system (uninstructed employees, especially new ones; alarms out of order; no alarms on system); watchman not visiting all parts of plant; concealed spaces in which sprinklers are located not known or indicated in some manner, which, if undiscovered, would result in excessive losses.—Thos. M. Donaldson in "Weekly Underwriter."

SPRINKLER AND HEATING (COMBINATION) SYSTEMS—The most interesting feature of this system is the method used for preventing the operation of the sprinkler



Insulating arm used in combined sprinkler and heating systems

heads from the heat of the water. The hot water has an average temperature of 180-200 deg. F. The maximum temperature used being about 245 deg. F. The melting point of ordinary sprinklers is 160 deg. F. In order to prevent the

overheating of the sprinklers, they are placed on short off-sets in which the water does not circulate. At first straight off-sets were used, but at present a curved pipe ¾-inch diameter and 18 to 20 inches long is used.—Gorham Dana.

SPRINKLERS, OPEN TYPE—These are used to protect the windows facing serious exposures and are not automatic in action (having no seal at the valve outlet). They depend upon human hands to operate a valve at the base of the riser through which water is conveyed to the sprinkler heads. They are also used at eaves and cornices and are sometimes called eave and cornice-sprinklers.

SPRINKLER RULES OF THE N. F. P. A.

Clear Space Below Sprinklers—Full effective action of sprinklers requires about 24 inches wholly clear space below the sprinklers, so that they may form an unbroken spray blanket from sprinkler to sprinkler and sides of room. Any stock piles, racks or other obstructions interfering with such action are not permissible. Sprinkler piping should not be used for the support of stock, clothing, etc.

Position of Sprinkler—Shall be located in an upright position. When construction or occupancy of a room or enclosure makes it preferable, permission may be given, except on dry-pipe systems, to locate sprinklers in a pendant position.

Position of Deflectors—Sprinkler deflectors shall be parallel to ceilings, roofs or the incline of stairs, but when installed in the peak of a pitched roof they shall be horizontal. Distance of deflectors from ceilings of mill or other smooth construction, or bottom of joists of open joist construction, shall be not less than 3 inches nor more than 10 inches; 6 to 8 inches is the best distance with average pressure and present types of sprinklers. Note particularly that the rule for distance refers to the deflector of the sprinkler.

In the case of fire-resistive buildings, the distance between deflectors and ceilings may be increased where conditions warrant; i. e., under panel ceilings. In semi-mill or other unusual construction, consult the inspection department having jurisdiction.

Detailed Locations—Sprinklers shall be placed throughout

remises, including basement and lofts, under stairs, inside levator wells, in belt, cable, pipe, gear and pulley boxes nside small enclosures such as drying and heating boxes, enter and dry-room enclosures, chutes, conveyor trunks nd all cupboards and closets unless they have tops entirely pen, and are so located that sprinklers can properly spray herein. Sprinklers are not to be omitted in any room merely ecause it is damp, wet or of fire-resistive construction.

Spacing of Automatic Sprinklers—Distance from Walls— The distance from wall or partition to first sprinkler shall not exceed one half the allowable distance between sprinklers n the same direction. Additional sprinklers may also be equired in the narrow pockets formed by bay timbers or eams and wall.

Partitions—A line of sprinklers should be run on each side of partition. Cutting holes through a partition to allow sprinklers on one side thereof to distribute water to the other side is not effectual. This rule applies to both solid and slatted partitions.

Where no inflammable material is stored close to the ceiling, the inspection department having jurisdiction may waive the requirement for providing extra sprinklers in narrow pockets formed by beams and partitions where the construction is entirely fire-resistive, including the partitions.

MILL CONSTRUCTION—Under mill ceiling (smooth solid plank and timber construction, 5 to 12-foot bays) one line of sprinklers should be placed in center of each bay and distance between the sprinklers on each line should not exceed the following:

8 feet in 12 foot bays.
9 feet in 11 foot bays.
10 feet in 10 foot bays.
11 feet in 9 foot bays.
12 feet in 5 to 8 foot bays.

Measurements should be taken from center to center of timbers.

Ceilings of modified mill construction having bays less

than three feet should be treated as open joist construction and sprinkler heads spaced accordingly.

Bay timbers spaced three feet or more on centers but less than five feet on centers, will require special ruling by the inspection department having jurisdiction.

JOISTED CONSTRUCTION—Under open finish joisted construction, ceilings, floors, decks and roofs, the lines shall be run at right angles to the joists and the sprinklers "staggered spaced," so that heads will be opposite a point half way between sprinklers on adjacent lines and the distance between sprinklers not exceeding 8 feet at right angles to the joists or 10 feet parallel with joists; the end heads on alternate lines being not more than 2 feet from wall or partition.

Exception—An exception may be made to this rule if the conditions warrant, viz., special permission may be given to install but one line of sprinklers in bays 10 to 11½ feet wide from center to center of the timbers which support the joists. In all cases where such bays are over 11½ feet wide, two or more lines of sprinklers should be installed in each bay as required by the rules for spacing. Where permission is given, the sprinklers should be placed closer together on a line so that in no case will the area covered by a single sprinkler exceed 80 square feet.

Smooth Finish, Sheathed or Plastered Ceilings—Under smooth finish, sheathed or plastered ceilings, in bays 6 to 12 feet wide (measurement to be taken from center to center of timber girder or other projection or support forming the bay), one line of sprinklers shall be placed in center of each bay, and distance between the sprinklers on each line should not exceed the following: 8 feet in 12 foot bays; 9 feet in 11 foot bays; 10 feet in 6 to 10 foot bays. Bays in excess of 12 feet in width and less than 23 feet in width should contain at least two lines of sprinklers; bays 23 feet in width or over should have the lines therein not over 10 feet apart. In bays in excess of 12 feet in width not more than 100 square feet ceiling area should be allotted to any one sprinkler.

Pitched Roofs—Under a pitched roof sloping more steeply

than 1 foot in 3, sprinklers shall be located in peak of roof, and those on either side of peak spaced according to above requirements. Distance between sprinklers should be measured on a line parallel with roof. Where the roof meets the floor line, sprinklers should be placed not over 3½ feet from where roof timbers meet floor.

Sprinklers not more than 2½ feet distant each way from peak of roof, measured on a line with the roof, may be used in lieu of sprinklers located in peak of roof as above.

In sawtooth roof the end sprinklers on the branch line shall not be over 2½ feet from the peak of the sawtooth.

Fire-Resistive Construction—The rules for slow-burning construction should apply as far as practicable. The rule may be modified, however, the intent being to arrange the spacing of sprinklers to protect the contents rather than the ceilings; but in no case shall the distance of a sprinkler on a line exceed 12 feet to a sprinkler on an adjoining line.

PIPE SIZES—**General Schedule**—In no case should the number of sprinklers on a given size pipe on one floor of one fire section exceed the following:

Size of Pipe.	Maximum No. of Sprinklers Allowed.
¾-inch	1 sprinkler
1 "	2 sprinklers
1¼ "	3 "
1½ "	5 "
2 "	10 "
2½ "	20 "
3 "	36 "
3½ "	55 "
4 "	80 "
5 "	140 "
6 "	200 "

Where practicable, it is desirable to arrange the piping so that the number of sprinklers on a branch line will not exceed eight.

FEED MAINS AND RISERS—**Location of Risers**—*"Center central"* or "side central" feed to sprinklers in

recommended. The former is preferred, especially where there are over six sprinklers on a branch line. In high buildings, allowance must be made for frictional loss and sizes of risers increased accordingly. Risers should not be located close to windows, and should be properly protected from mechanical injury or a possible freezing.

Pressure Gauges—A standard make, 4½-inch dial, spring pressure gauge shall be connected with the discharge pipe from each water supply, including each connecting pipe from public waterworks, and also as follows:

In each sprinkler system above and below the alarm check or dry-pipe valve.

At the air pump supplying the pressure tank.

In each independent pipe from air supply to dry-pipe systems.

Use of High Degree or Hard Sprinklers—High degree sprinklers should be used only when absolutely necessary and Inspection Department having jurisdiction should be consulted in each instance. When used, the following table should be referred to:

For ceiling temperatures exceeding 100 degrees but not 150 degrees, install 212 degree heads.

For ceiling temperatures exceeding 150 degrees but not 225 degrees, install 286 degree heads.

For ceiling temperatures in excess of 225 degrees, install 360 degree heads.

SPRINKLER FIRE TABLES

Compiled by the National Fire Protection Association.

	Watchman.		Sprinkler Alarm.		Thermostat.		Supervisory.		Total
	Satis-fact'y.	Fail-ure.	Satis-fact'y.	Fail-ure.	Satis-fact'y.	Fail-ure.	Satis-fact'y.	Fail-ure.	
Watchman & Sp'kler Al'm	77	81*	139	19	..	..	..	..	158
Watchman & Thermostats.	6	1*	..	..	6	1	..	..	7
Sprinkler Alarm & Thermo.	..	..	31	5	27	9	..	..	36
Watchman, Sprinkler Alarm & Thermostats	1	2*	3	..	3	..	..	..	3
Spr'kler Alarm & Sup'vis'y	..	..	31	3	..	..	34	..	34
Watchman & Supervisory.	2	..	..	..	..	..	2	..	2
Watchman, Sprinkler Alarm *& Supervisory*	8	9*	16	1	..	..	17	..	17
Sprinkler Alarm, Thermostats & Supervisory	..	..	5	1	5	1	6	..	6

Efficiency of Alarm Service, 1897-1916, Inclusive.

	Satisfactory.		Failure.		Total.
	No. of Fires.	Per Cent.	No. of Fires.	Per Cent.	
atchman alone	1383	89.5	162	10.5	1545
rinkler alarm alone	1460	93.6	100	6.4	1560
ermostats alone	170	78.7	46	21.3	216

	Watchman.		Sprinkler Alarm.		Thermostat.		Supervisory.		Total
	Satis-fact'y.	Fail-ure.	Satis-fact'y.	Fail-ure.	Satis-fact'y.	Fail-ure.	Satis-fact'y.	Fail-ure.	
atchman & Sp'kler Al'm.	1008	631*	1439	200	..	..	..	..	1639
atchman & Thermostats	19	6*	..	..	23	2	..	..	25
rinkler Alarm & Therm.	..	.	439	35	361	113	..	..	474
atchman, Sprinkler Alarm & Thermostats	35	55*	83	7	70	20	..	..	90
atchman & Supervisory.	4	4*	..	..	..	..	8	..	8
r'kler Alarm & Sup'vis'y	..	..	147	7	..	..	150	4	154
atchman, Sprinkler Alarm & Supervisory	47	54*	100	1	..	..	100	1	101
rinkler Alarm, Thermostats & Supervisory	..	..	26	1	22	5	27	..	27

Number of Sprinklers Operating.

). of Sprinklers perating	No. of Fires 1915-1916	No. of Fires 1897-1916 Inc.	Per Cent of Whole 1915-1916	Per Cent of Whole 1897-1916 Inc.
....	450	5314	34.6	31.1
....	226	2797	17.4	16.4
....	149	1761	11.5	10.3
....	86	1262	6.6	7.4
....	57	815	4.4	4.8
....	49	695	3.8	4.1
....	26	445	2.0	2.6
....	30	440	2.3	2.6
....	20	294	1.5	1.7
....	9	260	.7	1.5
....	12	226	.9	1.3
....	16	245	1.2	1.4
....	7	140	.5	.8

* These include fires where sprinkler alarm or thermostats notified the tchman.

Note.—These tables do not include fires where alarm service does or es not operate promptly if fire is at once discovered by employee, the *rm service having no bearing on such fires one way or the other.*

No. of Sprinklers Operating	No. of Fires 1915-1916	No. of Fires 1897-1916 Inc.	Per Cent of Whole 1915-1916	Per Cent of Whole 1897-1916 Inc.
14	15	170	1.2	1.0
15	8	132	.6	.8
16 to 20......	29	460	2.3	2.7
21 to 25......	28	306	2.2	1.8
26 to 30......	12	210	.9	1.2
31 to 35......	15	133	1.2	.8
36 to 40......	8	104	.6	.6
41 to 50......	12	155	.9	.9
51 to 75......	17	212	1.3	1.2
76 to 100.....	10	104	.8	.6
Over 100.....	8	413	.6	2.4
Total with data given..	1299	17093		
Water shut off sprinklers	19	178		
No data.....	22	262		
Total....	1340	17533		

Number of Sprinklers Operating.

No. of Sprinklers	No. of Fires 1897-1916 Inc.	Per Cent of Whole 1897-1916 Inc.
1	5314	31.1
2 or less....................	8111	47.5
3 or less....................	9872	57.8
4 or less....................	11134	65.2
5 or less....................	11949	70.0
6 or less....................	12644	74.1
7 or less....................	13089	76.7
8 or less....................	13529	79.3
9 or less....................	13823	81.0
10 or less....................	14083	82.5
11 or less....................	14309	83.8
12 or less....................	14554	85.2
13 or less....................	14694	86.0
14 or less....................	14864	87.0

or less	14996	87.8
or less	15456	90.5
or less	15762	92.3
or less	15972	93.5
or less	16105	94.3
or less	16209	94.9
or less	16364	95.8
or less	16576	97.0
or less	16680	97.6
er 100	413	2.4
tal with data given	17093	
ıter shut off sprinklers	178	
data	262	
Total	17533	

Sprinklers Opened on Wet or Dry Systems.

	No. of Fires 1915-1916	No. of Fires 1897-1916, Inc.	Per Cent of No. with Data Given 1915-1916	Per Cent of No. with Data Given 1897-1916, Inc.
:t system	1046	12236	79.3	80.2
y system	272	3016	20.7	19.8
tal with data iven	1318	15252		
ıter shut off ystem	19	178		
data	3	279		
Total	1340	15709		

Primary Water Supplies to Sprinklers Opened.

	No. of Fires 1915-1916	No. of Fires 1897-1916, Inc.	Per Cent of No. with Data Given 1915-1916	Per Cent of No. with Data Given 1897-1916, Inc.
.terworks	707	7809	53.8	51.5
ıvity Tank	270	4196	20.5	27.5

	No. of Fires 1915-1916	No. of Fires 1897-1916, Inc.	Per Cent of No. with Data Given 1915-1916	Per Cent of No. with Data Given 1897-1916, Inc.
Pressure Tank	252	2353	19.2	15.4
Auto. Steam Pump.	85	867	6.5	5.55
Auto. Elec. Pump..	0	4	..	.029
Steamer Connection	0	3	..	.021
Total with data given.............	1314	15232		
Water shut off system............	19	178		
No data............	7	309		
Total............	1340	15719		

Table Showing Effect of Sprinklers.

	No. of Fires 1915-1916	No. of Fires 1897-1916, Inc.	Per Cent of No. with Data Given 1915-1916	Per Cent of No. with Data Given 1897-1916, Inc.
Practically or entirely extinguished fire.....	984	11310	73.43	64.51
Held fire in check.....	305	5410	22.76	30.84
Total successful........	1289	16720	96.19	95.35
Unsatisfactory	51	813	3.81	4.65
Total.............	1340	17533		

Table Showing Effect of Sprinklers by Class of Occupancy.

	Extinguished Fire.		Held Fire in Check.		Total Satisfactory.		Unsatisfactory.		Total No. of Fires
	No.	%	No.	%	No.	%	No.	%	
Agricultural Implements	42	59.2	26	36.6	68	95.8	3	4.2	71
Auto. & Bicycle Fact's	53	59.5	31	34.9	84	94.4	5	5.6	89
Awning Factories	5	100.0	..	...	5	100.0	..	...	5
Bag Factories	4	57.2	3	42.8	7	100.0	..	...	7
Bakeries	27	67.5	11	27.5	38	95.0	2	5.0	40
Basket Factories	7	100.0	..	...	7	100.0	..	...	7
B't, N't & Screw Wks...	11	73.3	4	26.7	15	100.0	..	...	15
Boot and Shoe Shops..	371	74.7	107	21.5	478	96.2	19	3.8	497
Bottling Works	4	100.0	..	...	4	100.0	..	...	4
Braiding Mills	4	80.0	1	20.0	5	100.0	..	...	5

Breweries	5	83.4	1	16.6	6	100.0	..	...	6
Broom Factories	8	61.5	3	23.1	11	84.6	2	15.4	13
Brush Factories	8	80.0	2	20.0	10	100.0	..	...	10
Button Manufactories	15	88.3	2	11.7	17	100.0	..	...	17
Candle Factories	4	66.7	2	33.3	6	100.0	..	...	6
Candy Factories	49	74.3	16	24.3	65	98.6	1	1.4	66
Canning Works	7	70.0	2	20.0	9	90.0	1	10.0	10
Car Houses	19	47.5	16	40.0	35	87.5	5	12.5	40
Car Works	52	65.8	25	31.7	77	97.5	2	2.5	79
Carpet Mills	102	57.7	66	37.3	168	95.0	9	5.0	177
Carriage Factories	81	66.4	34	27.9	115	94.3	7	5.7	122
Cel'u'd (Pyroxylin Pl's'c)	77	66.3	23	19.8	100	86.1	16	13.9	116
Cement & Plaster Wks.	2	66.7	..	...	2	66.7	1	33.3	3
Cereal Mills	25	67.6	8	21.6	33	89.2	4	10.8	37
Chemical & W'te Lead	32	56.1	21	36.9	51	93.0	4	7.0	57
Clothing Factories	344	78.8	85	19.5	429	98.3	7	1.7	436
Coffee and Spice Mills	34	72.3	13	27.7	47	100.0	..	...	47
Coffin Factories	32	80.0	7	17.5	39	97.5	1	2.5	40
Cold Storage Plants	3	50.0	3	50.0	6	100.0	..	...	6
Cooperage Plants	41	55.4	25	33.8	66	89.2	8	10.8	74
Cordage Works	173	66.3	79	30.3	252	96.6	9	3.4	261
Cork Factories	6	50.0	4	33.3	10	83.3	2	16.7	12
Corset Factories	4	57.2	2	28.6	6	85.8	1	14.2	7
Cotton Ginnery	10	66.7	5	33.3	15	100.0	..	...	15
Cotton Mills	2808	60.7	1763	38.2	4571	98.9	52	1.1	4623
Cotton Warehouses	86	43.2	92	46.2	178	89.4	21	10.6	199
Cotton Seed Oil Mills	36	53.8	21	31.3	57	85.1	10	14.9	67
Cutlery and Hardware	7	53.8	5	38.5	12	92.3	1	7.7	13
Department Stores	256	79.6	55	17.0	311	96.6	11	3.4	322

SPRINKLER SUPERVISORY SYSTEM—1. No gate valve in the sprinkler system can be closed, wholly or in part, without immediate notice to the outside Central Office.

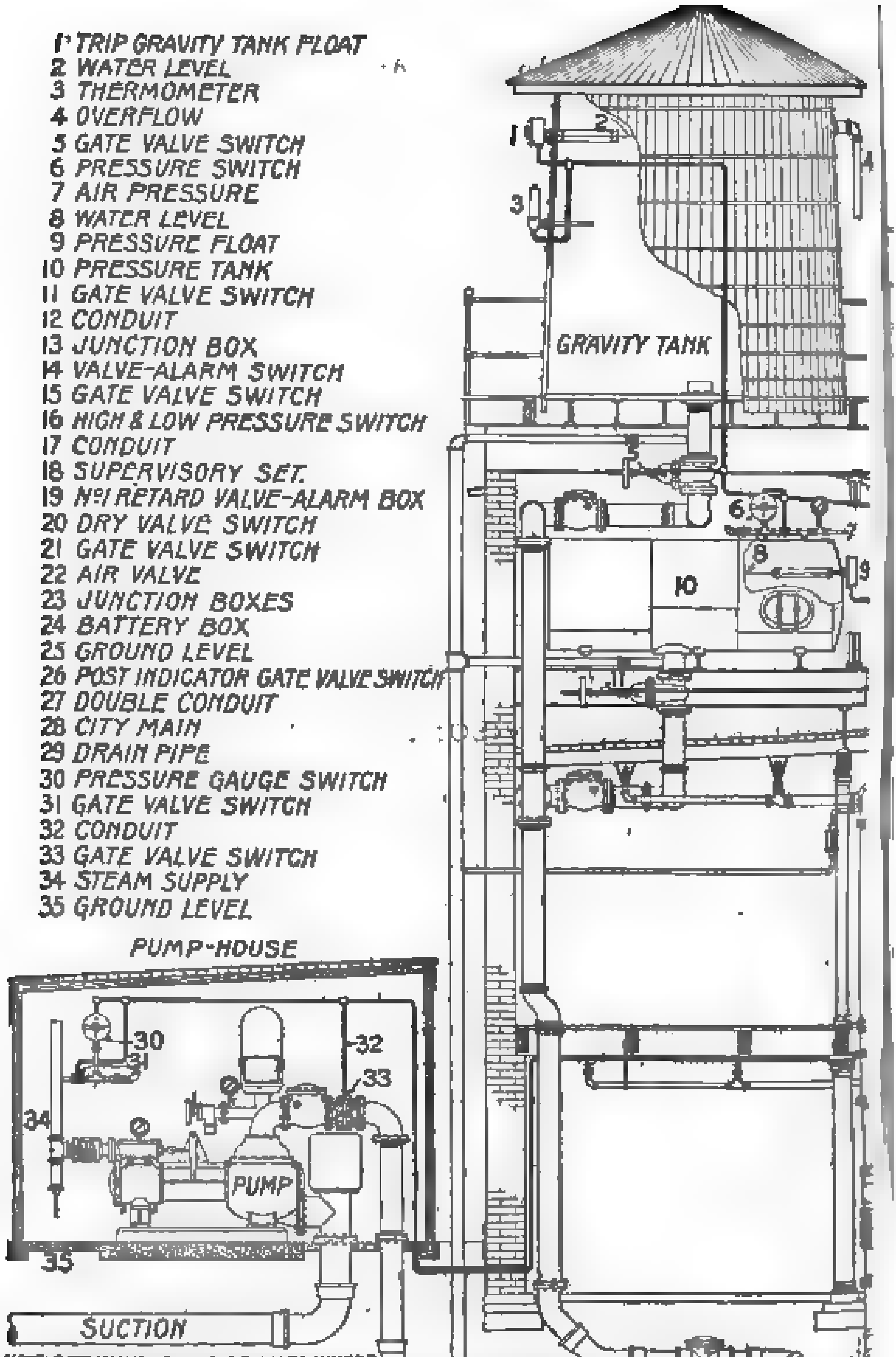
2. The presence of water leakage equal to the discharge of one or more sprinkler heads is instantly recorded at the Central Station and from there, if necessary, to the fire department.

3. Thus the operation of a sprinkler head, or the pulling of a manual fire alarm box, that is included in this equipment, assures at the earliest possible moment notice to the fire department of the presence of a fire and brings immediately the most important auxiliaries to the aid of the sprinklers.

4. Not more than six inches of water can drop in any of the sprinkler tanks without immediate notice to Central Office.

5. The water in any exposed tank can neither freeze nor become dangerously warm without instant signal to the Central Station.

6. *There cannot* be a drop of more than five pounds of



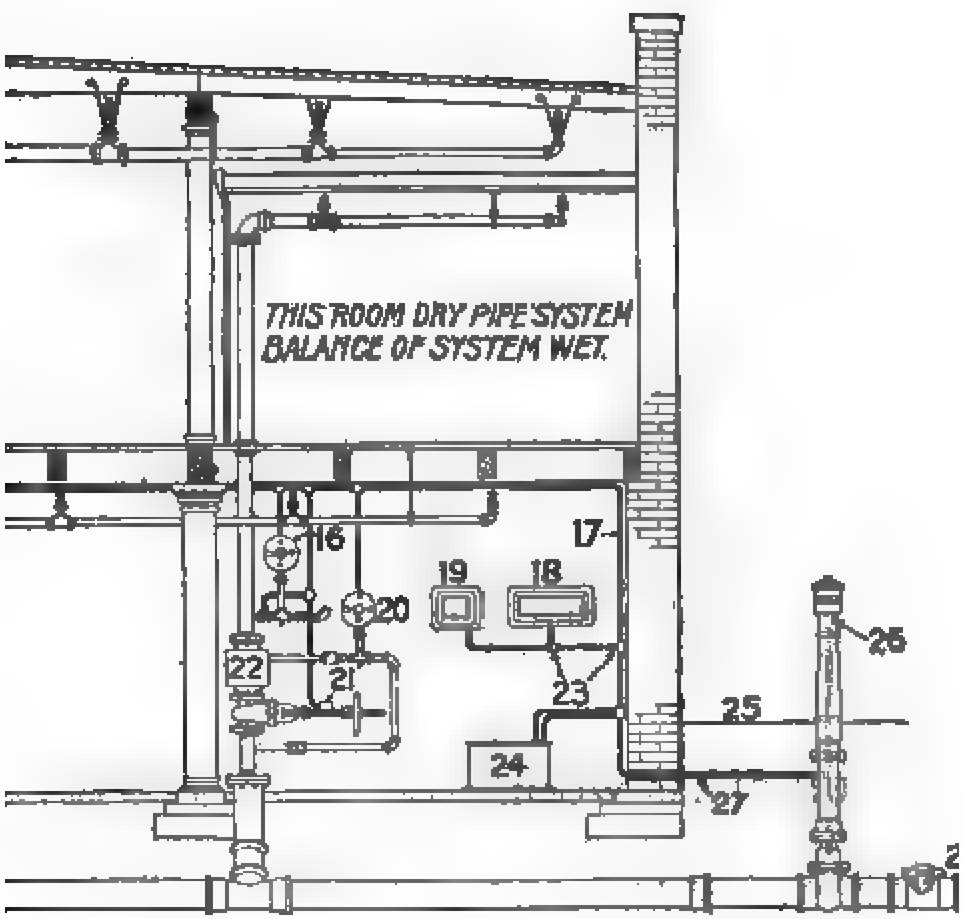
Sprinkler Supervisory

SUPERVISORY AND VALVE-ALARM SERVICE

A.D.T. SYSTEM

DIAGRAMATIC DRAWING

TYPICAL SPRINKLERED RISK.



Sprinkler Supervisory

pressure in either the pressure tanks or fire pumps without immediate notice to Central Office.

7. No defect or disorder in the sprinkler system can occur without due notice to the district office.

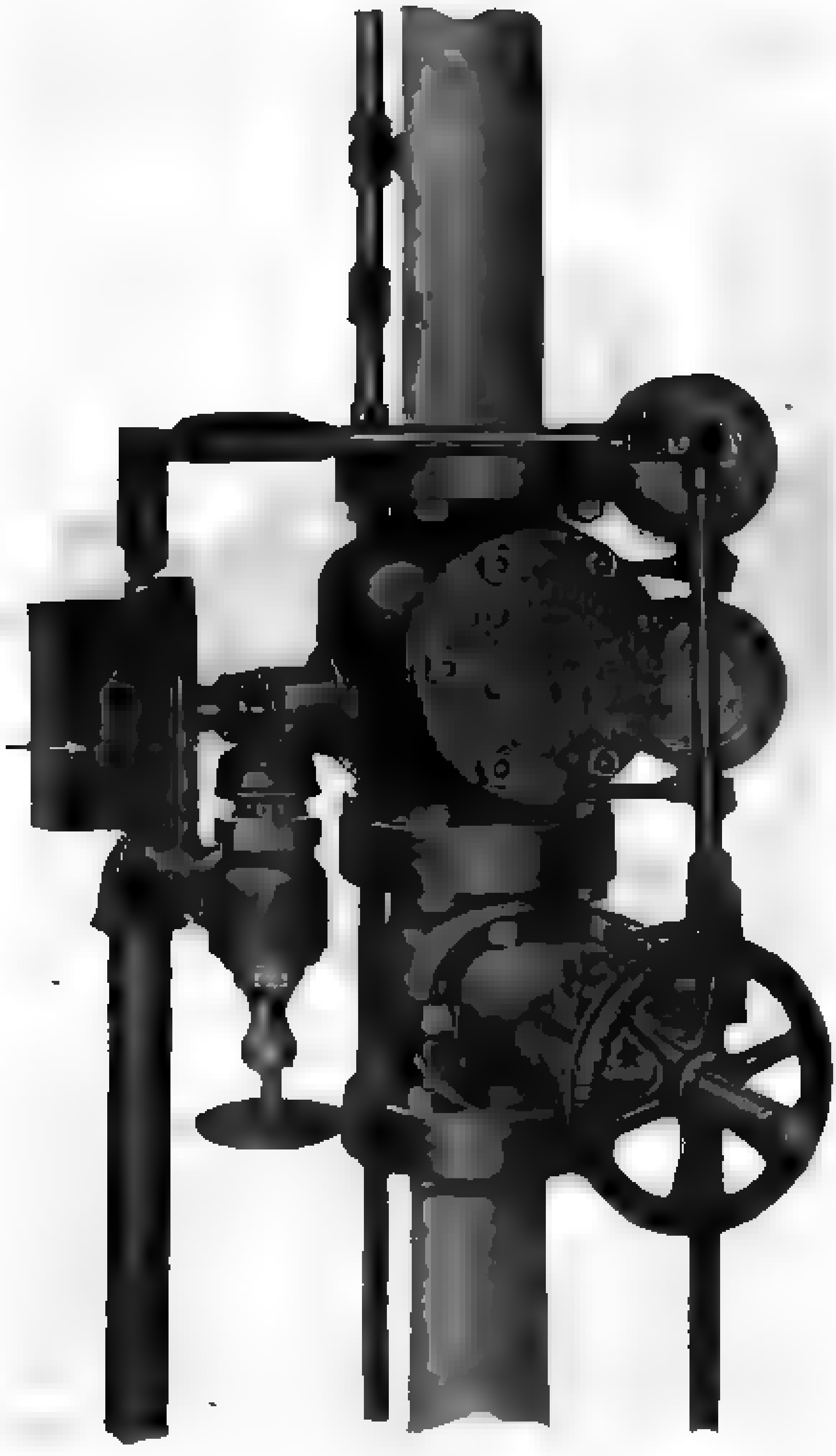
Gages on pressure tanks are set so that alarms are communicated to the Central Office if the pressure falls below 70 lbs. or exceeds 85 lbs. On some equipments this latter pressure is changed to 90 lbs.

On all up-to-date equipments there is a drip or drain-off pipe about 2 inches in diameter near the main pipe (riser) which supplies the sprinkler branch lines. Also on the riser there is a pressure gauge so that the normal pressure can be readily determined. This gauge should be read and tested frequently and if not in proper working order, repaired immediately.

By means of the drip pipe, the normal flow of water can be easily determined. Being much smaller than the sprinkler riser, the flow of water through this pipe should not appreciably reduce the normal pressure when a test is being made. In this manner clogged water pipes or leaky or closed valves can be located. This is a better method than reading the pressure gauge or testing by means of the usual half inch test pipe. The latter is so small that the flow of water through it does not accurately show the condition of the system.

SPRINKLER VALVES (Closed) have resulted in total losses even in risks with 100 per cent equipments. A closed valve prevents water from reaching the seat of fire. Frequent causes of closed valves are repairing the system and then forgetting to turn water on, and cutting off mains or supplies which are subject to freezing. If it is necessary to close a valve, station a man at the valve to turn it on in case of fire.

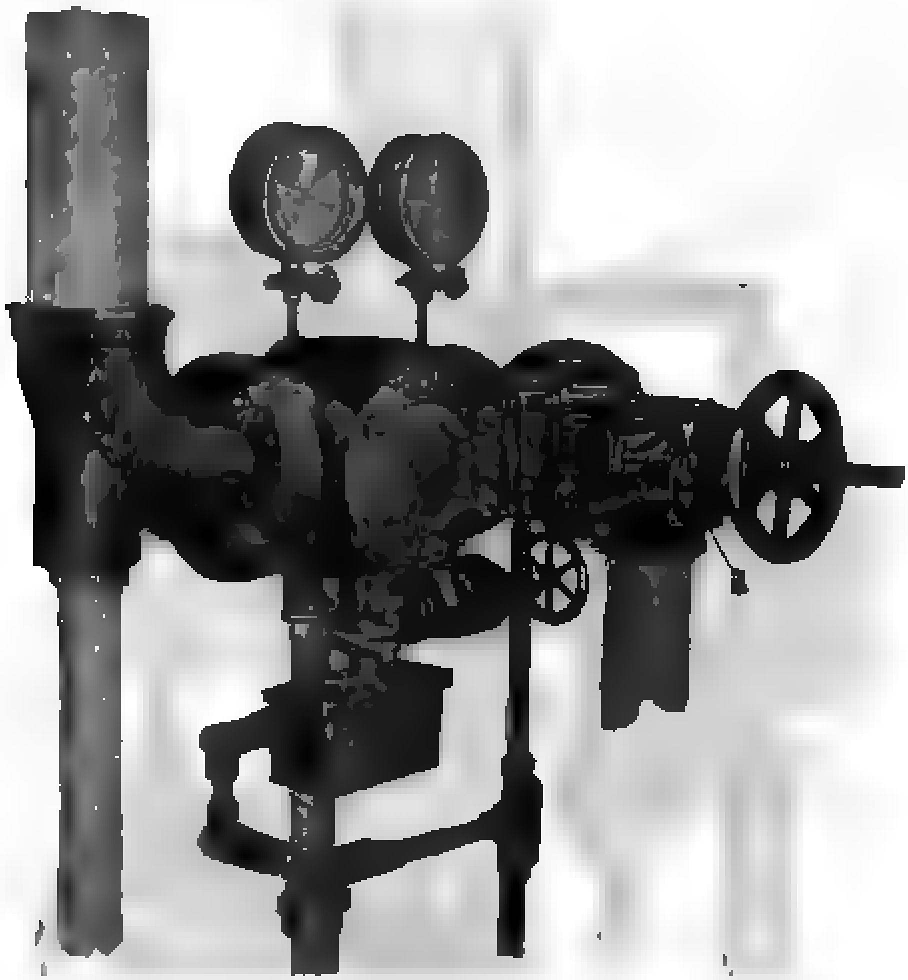
SPUN GLASS WOOL—Spun Glass is made by heating a rod of glass with an ordinary glass blowpipe. As soon as the glass is at the proper temperature it will stretch. The heated end is stretched out and run on a drum. This drum revolves and takes a fine thread from the hot rod of glass



Grinnell wet system, showing supervisory alarm and wa
flow device

The finished threads are made up into cloth, ink erasers, aigrettes, etc. Fair insurance risks.

SQUEEGEE—Implement shaped like a wide hoe with a rubber strip at edge of blade, used by insurance patrol men and others for pushing water.



Grinnell gate valve with supervisory gate valve box

STABLES (horses)—It is important that the location and number of horses be fully brought out in an inspection report of a stable risk, also whether the runway is straight or winding and leads directly to the street or whether it may be blocked at night by wagons. The fire record proves that you may count on a total loss in almost all cases where the animals are above or below the grade floor, unless the exits and runways are standard. A horse cannot be led from a *burning building* until his eyes are blindfolded.

Oat Crushers—Should have magnet attachments so that nails and other foreign metallic substances will not pass through the roller and cause sparks to ignite the dust.

Stable Lanterns—Whenever gas lights are used in stables, the jets should be protected with glass enclosed lanterns which prevent the hay and straw from coming in contact with the naked flame. Kerosene lanterns should not be permitted. Electricity is the best method of lighting.

Private Family Stable—This is perhaps the best class that can be had and is one used exclusively by one family for housing of horses and pleasure vehicles. Usually the upper portion of the building is occupied for dwellings by the coachmen. There may also be a hay loft containing rubbish.

Private Business Stable—This is one where the occupancy is that of a single tenant housing horses and business vehicles and run as part of or in conjunction with some regular business. This class would include stables run in conjunction with retail stores, breweries, dairies and large merchants. These are usually desirable as the conditions present are in most cases better than the ordinary stable because more attention is paid to care and maintenance.

Boarding Stables—These are commonly used by individuals or merchants for the boarding of their horses, carriages and wagons. In other words, the proprietor reaps a profit for assuming this care.

Livery Stables—In these stables, horses, carriages and wagons are kept for renting to others, and quite often they are run in connection with boarding stables. While not so desirable as a private business stable, they are good as second choice.

Riding Academies—They are usually an adjunct to a livery stable and consist of a large covered addition with a tan-bark floor for indoor riding. They can be placed in the same class as livery stables.

Express and Trucking Stables—While similar to private business stables attention should be given to the kinds of merchandise apt to be stored on the premises overnight.

Contractors' Stables—Private business in nature, but usually filled with wooden forms and moulds, tools, machin-

ery, rigging, etc. Laborers have caused many fires by smoking. The poorest type of stable risks.

Sales Stables—At these stables, usually only horses are kept and they are held for private sales or auctions. This is one of the most carelessly kept classes, mainly because the help employed is not of the best. The sporting trade and representatives of buyers frequent these stables smoking, etc. As a rule, there is not much interest in keeping these stables clean, because the horses are kept for a short time only. On the other hand the horses are kept spic and span so as to command a good price. They are not so good as would be in a private business or family stable.

Veterinary Stables—In these stables, horses are doctored and treated for wounds, lameness, etc. The class can be likened to hospitals, for in case of fire many of the horses will perish because some cannot be moved except with great difficulty. In some cases it will be found that horses are suspended from the ceiling by braces.—S. T. Skirrow in "The Weekly Underwriter."

STACK—The brick chimney of a boiler or furnace. Most brokers insist on brick stacks being excluded from the building form. This is wise as the stack is usually the only part of a building which remains intact after a serious fire.

STAGGERED—A term used in connection with spacing of sprinkler heads; also casks of water on piers or foundry roofs. Say casks of water on one side of pier are placed every 100 feet. The next row should be placed so that the casks will be opposite a point half-way between casks on the opposite side.

STAGING the temporary flooring of scaffolds or platforms. In fireproof buildings, especially theatres and churches, this constitutes an extra hazard while the building is in course of construction because of the large amount of light wood framing used in the interior.

STAIN REMOVERS—Sometimes contain inflammable liquids.

STAINING WOOD—The process is similar to that of fireproofing wood, except that iron salts and bark extracts are used. Poor fire record class.

STAIR—A boxed stairway is one that is enclosed without a hallway, the enclosing material being fastened against the under side of the stairs and boxing in the sides. If there is a self-closing door at the top of each stair-landing, it is much better than a wood enclosed hallway.

A wood enclosed stairway is one with a continuous shaft including the hallway. Fire in this class of shaft could travel from the lower floor to the top of the building. A boxed stairway is much better than a wood enclosed stairway.

STAIR BUILDERS—Hand or power carpenter shop hazard with occasionally priming and painting.

STAIRCASES of wood may be rendered practically fire-resisting, if the spaces underneath the treads and risers and between stringers, and also under the lower joists of landings are closed solid with mortar or other incombustible material. A good protection is a metal lath and plaster ceiling. See Shafts.

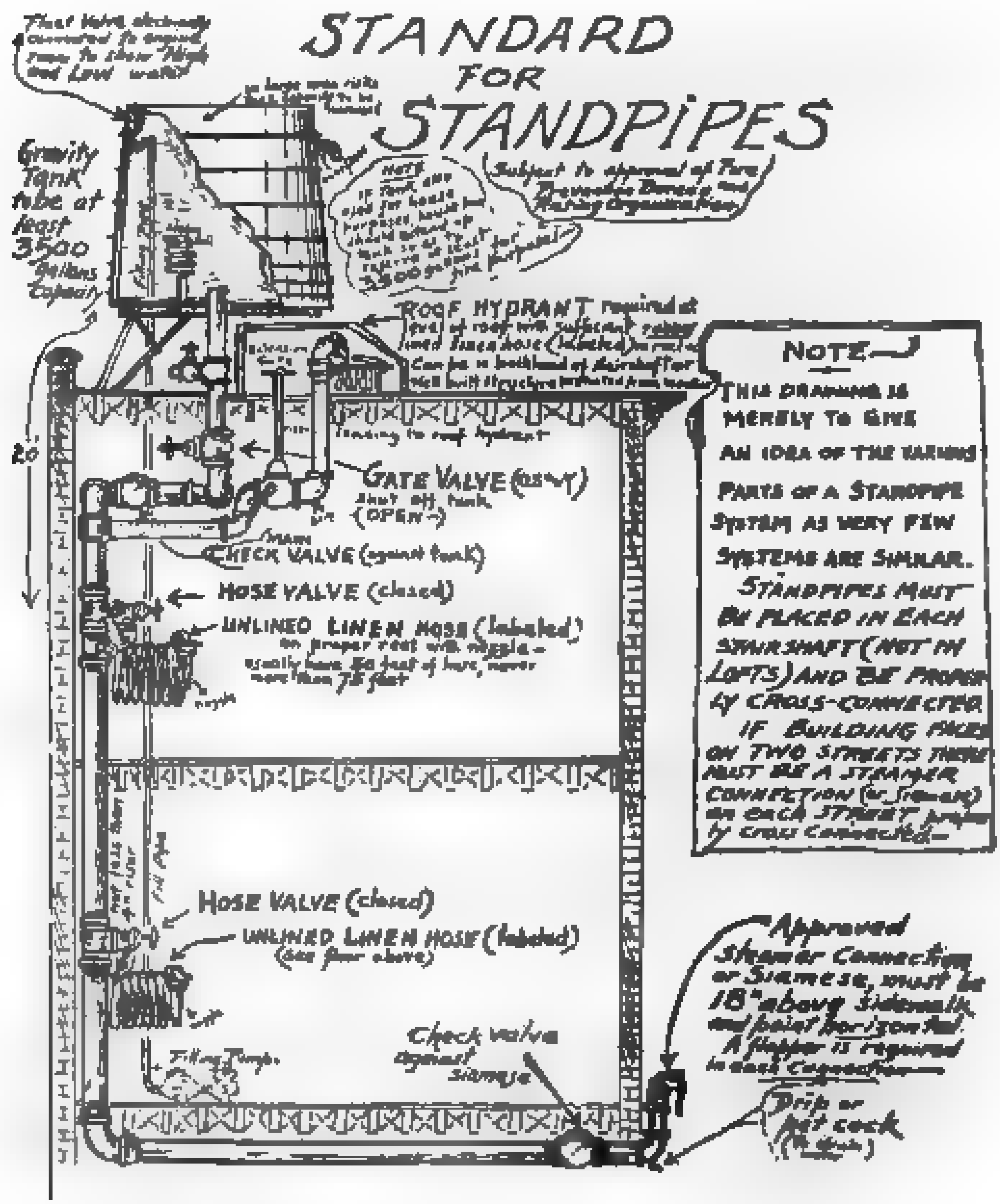
STAIR PADS—Usually made in mattress factories, and the hazards are practically the same. A cheap grade of stock is generally used. Some manufacturers buy up old cotton-stuffed settees and upholstered furniture and use the stuffing for the stair pads. Jute, moss and other fibres are used. Hazards of pickers, "garnet" machines, lappers, untidy premises, and dust-laden atmospheres. Serious exposure to surrounding properties. A K. O. class.

STAMP COLLECTIONS—Many single stamps are quite valuable, and a small collection of rare stamps reaches a large sum. An expert is needed to determine values as minor defects or flaws render an otherwise valuable stamp nearly worthless. A class of insurance not usually solicited.

STAMPING—See Embroideries.

STANDARD—Refers to devices approved and labelled by the Underwriters' Laboratories and other devices or methods of construction which are approved by the various Bureaus. As a general rule, the requirements of the Insurance Companies Bureaus' are higher than those of States and Municipalities. Often Fire Departments will require installation of devices or change in construction which are not considered standard by the Bureaus; on the other hand, prac-

tically all requirements (except as to protection of life) of the Fire Insurance Bureaus are acceptable or exceed the requirements of the local authorities.



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STANDPIPE—A water tower or a vertical water pipe with hose connections for fire purposes. Those installed in new buildings should always be given a fire test. A recent *test showed* many risers to be badly clogged. A fire chief

in New York City declared that carelessness and lazy workmen frequently throw bricks, dirt and cement into the open riser rather than take the trouble of carting them downstairs. The hose should be inspected occasionally, as they have been found badly rotting close to the nozzle and couplings. This is due to cleaning compounds containing acids used on the brasswork, and the seepage of water. Siamese or fire department connections on the street become clogged unless properly capped. They should be carefully examined periodically, as caps become rusted at the coupling or are stolen. On piers, or other similar places where many outsiders have access, it is quite customary to remove the brass nozzles so that they will not be stolen, or substitute malleable iron ones. As a ruse, some owners paint brass nozzles black to resemble iron. The absence of standpipes in high non-fireproof buildings cause a serious delay in case of fire, as the fire department hose has to be hoisted to the top floor on the outside of the building. See illustration for complete details of standpipe system, page 644. See Reinforced Concrete Standpipe; also Steel Standpipe. See Siamese Connection.

STANFOIL is tinfoil made of pure tin.

STANNIC CHLORIDE—A liquid which, when mixed with water, causes intense heat to be generated. Used in dyeing and calico printing. Known as muriate of tin.

STARCH is composed of carbon, hydrogen and oxygen and made from wheat, potatoes, corn and rice.

Starch (as made from potatoes)—The potatoes are washed in water in a revolving tube and grated. The grater is a cylindrical tube of iron, encased in wood, having perforated iron bands and rough sides which, in revolving, grates the potatoes. The pulp passes over a moving screen upon which water is played from hose streams. This forces the pulp through the screen, the waste matter being shaken off. The pulp travels through troughs to precipitating tanks, where, after settling, the water is drawn off and the starch placed in agitator vats. The mass is then dried by atmosphere on a slatted wood floor and barrelled.

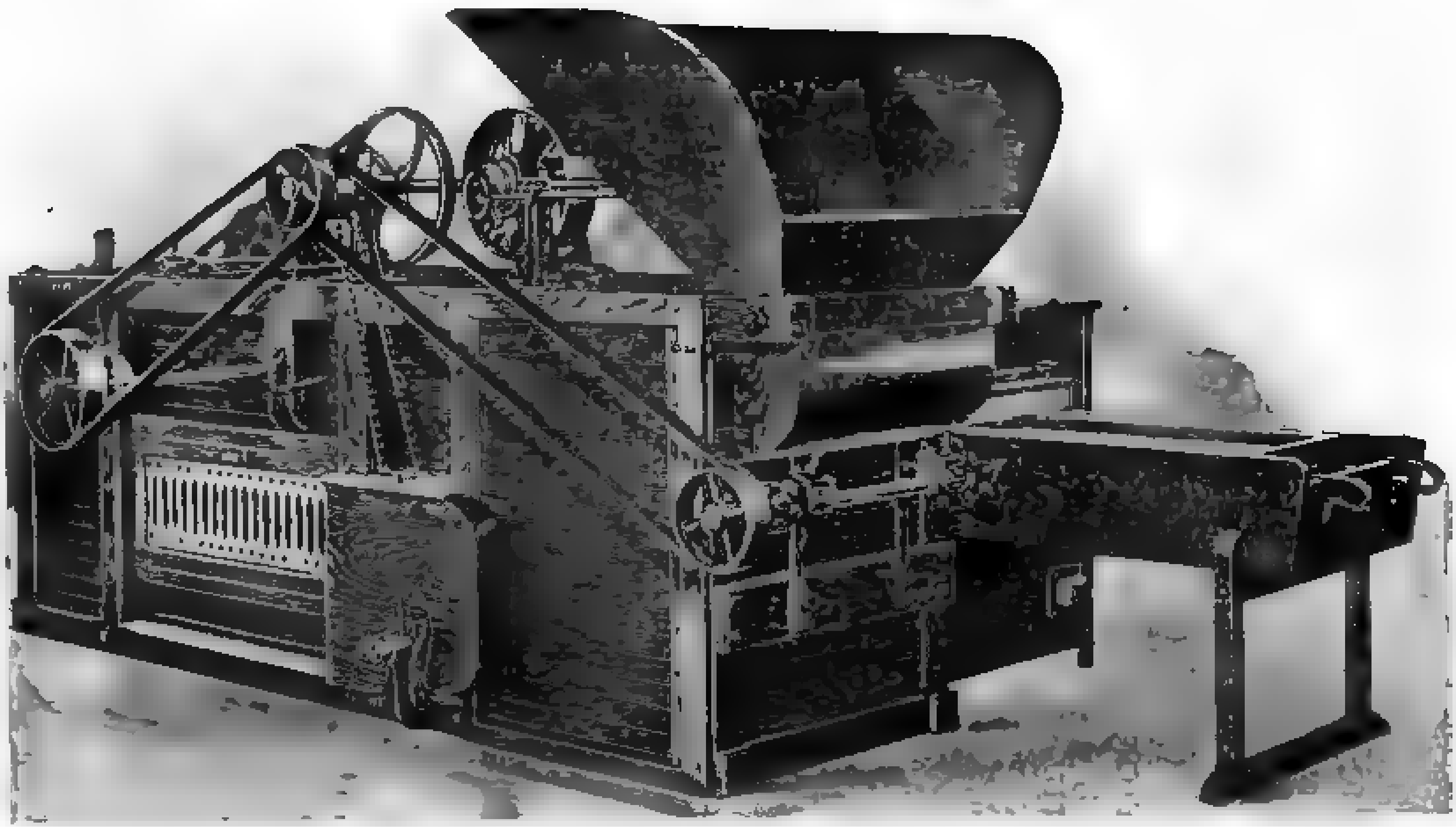
STARCH BUCK—A wood enclosed automatic machine

with an inner screen working back and forth, and a hopper at one end for candy, while at the opposite end there is an opening for the starch. This machine automatically separates the starch from the candy, cleans and delivers the candy, refills and delivers the trays all with a minimum amount of dust. For this reason they are recommended for factories making candies. See Candy Factories. See Illustration, page 647.

STARCH FACTORIES—All machinery such as pulverizers, grinders, attrition machines should be grounded to carry off static electricity generated by rapidly-moving machinery. All conveyor pipes and ducts, elevator legs, should have dust collectors to **prevent dust explosions,** which often occur. Explosion boxes to vent and reduce the force of explosion are necessary on legs and conveyors. Fires occur in pressing and drying rooms where the drying and pressing oil from "germ" (ground corn) takes place. The germ left in dryer tank decomposes from the heat given off, generating a gas which ignites. Poor fire record. Accommodation business. See Dust Explosions.

STARTING BOX—A rheostat used for starting and controlling motors.

STATIC OR FRICTIONAL ELECTRICITY is more liable to be generated when the atmosphere is clear and dry than when it is moist. It is generated by the rubbing together of substances that in themselves are non-conductors of electricity; such as dry wood or rubber. It may be generated by friction between a non-conductor and a conductor; such as gasoline and a metal pipe, although in the latter the intensity is much diminished. During the process of filling an automobile there should be a good metallic connection between the storage tank and the tank of the motor vehicle, so that all electricity generated may readily pass off to the ground as fast as generated. In filling tanks of automobiles or a can with gasoline strained through chamois from metal cans, the can should rest on metal to afford a good ground. Discharges of static electricity are *without doubt* the cause of many mysterious gasoline explosions. Where explosive vapors are used in connection



"Simplex" Starch Buck.

with machinery, all machinery should be grounded to carry off any electricity which may be generated. See Lightning.

STATIC PRESSURE is pressure produced by water as a result of its own weight.

STATIONERS' SUPPLIES—Consist of stationery, various wood, metal and paper articles and novelties, school supplies, toys. Celluloid goods are sometimes included. Fair insurance risks.

STATIONERY STORES—Failures and fires are quite frequently reported in this class.

STATUARY (bronze)—Those of large size are made from miniatures, or replicas of wax which are covered with a plaster form or a covering applied by hand. The wax is melted out in a furnace and the hollow space remaining is filled with molten bronze. The wax used is a mixture of glycerine, gelatine, carnauba wax and bees-wax. The foundry work is extensive. Here we find built-up brick kilns, core ovens, wooden flasks and furnaces. Dilute sulphuric and nitric acids are used for cleaning bronze parts. The waxes used are generally heated by direct fire. This work is found in most of the departments. Large stocks of models constitute considerable proportion of the value of the contents and should be considered the same as patterns. These structures are usually frame of foundry type. Fair insurance risks. See Sculptors.

STAYER—A device of paper or linen for reinforcing the corners of paper boxes.

STAYS—Generally applied to props, struts and ties for keeping timbers in place.

STEAM—Is water converted into an elastic vapor by the application of heat. **Low pressure** steam has a pressure below 15 pounds to the square inch.

High pressure steam according to the rules of the New York Exchange has a pressure above 15 pounds to the square inch. They will treat boilers as low pressure if the safety valve is set at 15 pounds. If boiler room is cut off with 12-inch brick or concrete side walls with standard doors at openings and 8-inch concrete or brick ceiling on steel beams, *no extra charge* is made in rate.

The reason steam is used (especially high pressure steam) to extinguish fires is because it expands, thereby driving away the oxygen from the flames.

STEAM FITTERS' SHOPS—Cutting, welding and threading pipe, and machine shop work are main hazards. Gasoline torches or furnaces are for use on outside jobs. Floors are generally oily, especially at pipe threaders. Fair insurance.

STEAM JETS—The efficiency of steam jets for fire extinguishment lies in the confinement of the steam and its smothering effect on the fire, depriving it of its oxygen.

STEAM-NIGGER—Device consisting of steam cylinders, levers and hooks or lugs, to manipulate logs at a saw-carriage.

STEAM PIPES must be at least 2 inches from all unprotected woodwork. If protected by a metal collar, the distance may be 1 inch. There is much less damage likely from low pressure than from steam at high pressure.

Steam pipes, if in contact with wood, have been known to cause occasional fires. It is claimed that any steam pipe in contact with wood, no matter how low the pressure, will in time produce charcoal, and as charcoal is unquestionably subject to spontaneous combustion, the recommendation to remove woodwork from all steam pipes is well founded.

Before heat is turned on at the beginning of winter all dust and refuse around pipes should be removed. See Pipe Openings.

STEAM PIPE COVERINGS—The covering on the asbestos-magnesia packing is usually muslin. As this is readily ignited when dry, no smoke pipe, naked steam pipe or gas jet should be placed too near it. Fires have been known to flash along the muslin covering for a long distance.

STEAM TANKS or kettles (set through flooring) where high temperatures are needed, should be 2 inches from wood flooring.

STEARIC ACID—Usually prepared from beef tallow by saponification with sulphuric acid, distilling and pressing *while still hot.* Used in soap and candle manufacturing.

STEARINE—It is a mixture of stearic and palmitic acid, manufactured by decomposing tallow and other fats or oils with water, dilute sulphuric acid and milk of lime. Employed in making candies. Non-volatile.

STEEL—A kind of iron or rather a compound of iron and carbon. In every 100 lbs of steel there are from 2 to 2½ *lbs. of* carbon. Steel is made from either cast or wrought-*iron.* There are two kinds of steel, one is brittle, the other

is just the opposite, i. e., very flexible. If steel is heated, then suddenly cooled, it will be hard and brittle. If it be cooled slowly it will be soft, and can be readily hammered out like wrought-iron.

Steel begins to lose its supporting strength at a temperature of about 900 deg. F., after which its loss of strength is extremely rapid until at 1600 deg. F. it is practically nil.

Steel (shear)—Hammered steel of fine texture and tougher than ordinary steel.

Steel (soft)—Naturally a gray color, is turned to a bluish tint by heating. A long, narrow metal frame with small perforations at top is used for this purpose. Gas flames at the perforations heat the steel when it is placed on top. See illustration, page 650, on unprotected steel or ironwork. See Structural Steel.

STEELITE—A new metal composed of 75 per cent cobalt and the remainder chromium. It is used for tools and will cut steel on a lathe. It is impervious to rust or acids.

STEEL SHAVINGS, CHIPS AND FILINGS—(From lathes and other metal working machines.) Factories often throw out the shavings made until sufficient quantity is on hand to fill a freight car. Fires often occur on account of oxidation taking place faster than the resulting heat can be conducted away from the steel which is very finely divided. It is hard to find the seat of such fires in order to extinguish them. Shavings and scraps should be piled at a considerable distance from the buildings and be moved as often and as regularly as possible. (C. W. Brandt.)

STEEL STANDPIPE for water supply systems, cost more for maintenance than concrete standpipes. It is usually necessary to paint them once a year, which requires that the standpipe be emptied and allowed to remain empty for a period of ten days to two weeks for drying, during which time other standpipe systems or direct pump must be resorted to. The life of a steel standpipe may be somewhat less than 30 years. (S. T. Skirrow.)

STEEL WOOL—The shavings from steel wire. Commercially it is practically useless if wet. Steel wire rusts readily and in that condition cannot be used until the rust

has been removed. Spontaneous ignition is apt to occur in piles of steel wool, if any oil is present.

STENCILS—Made of paper or metal by cutting out the lettering or designs by means of jig saws or stamping presses. Mild tinsmith hazard. Only fair insurance risks.

STEREOTYPING—This necessitates the formation of the type in cylinder or roller form, while the metal which provides the backing must also be in the same form. To provide this cylindrical form is the next step. The type is removed to a table and a sheet of specially prepared paper called the matrix is moistened and laid over the face of the type and is either beaten with a large brush so that an impression of the type is fully made, or it is run through a power roller press to accomplish the same result. After the impression has been satisfactorily made, the form with the matrix is placed on a steam table to dry, and when removed the matrix is still flexible enough to shape in the desired manner. The matrix is now put into a casting box, which, when closed, forms a mould in the shape of a crescent, on one side of which the matrix is placed. Molten lead is poured into the remaining space from the top, and when filled the metal soon hardens sufficiently to be removed. The form has now been reproduced on a solid piece of metal which after being trimmed and grooved is ready to be placed in the press for printing the paper. Furnaces are used for heating and melting lead for casting, and the metal backs for copper sheets. Ordinarily they are large iron kettles set in brick, and coal or gas heated. Floors around same should be brick or covered with sheet iron. Good insurance risks.

STICKERS—Woodworking machines similar to matching-planers only smaller. They have cutters for each of four sides of stock and make considerable refuse. Should have blowers and shaving vault.

STICK LAC—Lac in its natural state, but moulded in the form of a stick.

STILES—The flat vertical pieces between and at the sides of panel doors or windows.

STIPULATED WAREHOUSE—See Warehouses.

STOCK INSURANCE—See Mutual Insurance.

STOCKS should not be placed against the walls, and should be on skids at least 6 inches from the floor. Aisles of 2 feet should be maintained, and stock should not be piled nearer than 2 feet to the ceiling.

Stocks on grade floors of frame buildings are considered nearly as good as similar stocks in brick buildings. They are just as accessible to the fire department. The hazards are the same, and salvage is as great. Furthermore, a frame building being smaller in area and height than the usual brick structure, in case of a collapse, will precipitate less weight on the grade floor stock.

Stocks in poorer sections of the city may not be attractive in appearance, but where the stock is suitable for the neighborhood, the business established for a length of time, and the other conditions incident to the business are satisfactory, they are sometimes preferable to more pretentious stores in better sections.

Stock valuations are usually based on the assured's inventories. If these are destroyed by fire, the inventories of similar plants of like size and character are used to get at an approximate value. See Lines; see Retail Stocks; also Upper Floor Contents.

STONE under the action of severe heat will crack, shell or calcine. It should be used most cautiously in fireproof construction.

STONE FRONTS—Are commonly used for ornamentation purposes. Serious damage is caused by fire spalling, and water striking the heated stone, causing same to chip and crack. Underwriters watch this feature when making an authorization.

STONE YARDS—Usually enclosed in a high roofed over, light constructed frame shed. Many have a traveling, motor-power crane on track and trestle. Granite and polished stone is subject to severe damage by fire and water. Good insurance risks.

STORAGE AND REPAIR CLAUSE should be placed on all policies where goods are likely to be left on storage. Insurance companies demand that this clause be attached to their policies so that exorbitant claims cannot be made

after a fire occurs. Examiners should see that this clause is attached before passing the line.

STORAGE LINES—Companies prefer to write short term insurance on contents instead of yearly insurance on the buildings themselves, as a greater premium income is thus derived because "short rates" are charged.

STORAGE STORES, FREE AND BONDED—The difference between these stores is—in the "Free Store" the duty or revenue is paid to the Government before the goods go in storage; while in a bonded store it is paid when the goods are removed. To remove goods from a "Bonded Store" it is necessary to pay the duty or revenue on the amount that is desired to be taken out of storage. When the duty (amount demanded by Government) is received by the Custom House, they issue an order to their representative at the storage store showing that the duty has been paid and he permits goods to be removed.

NOTE—Each bonded store has a Custom House officer on the premises at all times. His duty is to see that no goods are removed unless an order is shown that the duty has been paid. The object is so that the owner need not pay the duty or revenue until the goods are actually sold and removed from the warehouse. Good insurance risks.

Storage stores (listed) must be occupied, and be under the exclusive control of the warehouseman. In New York City, in order to have a store listed, the Board of Underwriters issue certain requirements as to lighting, construction and occupancy. No volatiles or chemicals are permitted. Excellent insurance risks. (Richardson.) See Warehouses.

STORAX—An imported resinous gum used by perfume manufacturers.

STORE FIXTURES—Manufacturing hazards are those of woodworkers, including painting and varnishing. The fire record is not good. Accommodation business.

STOVE FACTORIES—Foundry, machine and metal working hazards combined. Good insurance risks.

STOVE-PIPE WORKS—Work is mainly sheet metal working. Elbows are dipped in a mixture of three parts *naphtha to one* part of machine oil for "varnishing." An un-

profitable class for most insurance companies. (Henry Siemer.)

STOVE POLISH may contain a large percentage of benzine or similar volatiles.

STOVES—Should be on iron stands or legs, with metal under and 12 inches in front of stove, and 3 feet from combustible partitions; if partitions or woodwork are shielded with metal, the distance may be 18 inches.

Stoves (kitchen)—There is a type of kitchen range being used from which it is unnecessary to remove the ashes by means of the ordinary pan. A funnel is provided underneath the grate of the range. This funnel or pipe extends through the floor to a receptacle in the basement. The pipe or funnel should be insulated by a protecting sleeve so as to provide air space where passing through the floor. There is danger of clogging the funnel from neglect in emptying the container in the basement. This method of dropping hot ashes out of sight does not appeal to most underwriters unless they drop into a substantial brick enclosed ashpit having a heavy iron door.

Stoves (pot stoves)—Are used extensively in lofts as they give out large volumes of heat. The fire pot which consists of an unlined iron casting one-fourth to one-half inch thick expands or contracts from excessive heat, and sudden cooling when the fire goes out. This causes cracks, which enlarge and allow the hot coals to fall on the floor.

STRAIN—When a solid body is subjected to a stress of any kind an alteration is produced in the volume or shape of the body and the alteration is called the strain. Strain is, therefore, the result of a stress or stresses.—(Kidder.)

STRAINER—Used on sprinkler suction lines where water is likely to contain weeds, refuse, etc., or where intake is from a pond. See Foot Valve.

STRAP HINGE—A hinge with an extension arm. Must extend three-quarters distance across fire doors, to be approved by Underwriters.

STRAW DYNAMITE—Is nitroglycerine with nitrocellulose made from straw.

STRAW GOODS stock will give a very poor account of

itself in a fire because the strands are usually glued together and sized.

STRAW HAT DYES—Are ordinarily made of shellac, aniline colors, denatured alcohol and benzole. Only 1 part of benzole to 16 parts of alcohol is the general proportion. Flash point is about the same as alcohol. See Hats, Straw.

STREET CLEANING DUMPS—A very poor fire record class. See Dumps.

STREETS (Unpaved)—Should always be indicated on inspection reports. In bad weather fire departments experience difficulty in traversing unpaved, muddy roads, hence a delay in reaching a fire.

STRENGTH OF MATERIAL—See Stress, Compression and Tension.

STRESS—A stress is an internal resistance which balances an external force. By placing a weighty object on another object of similar character there is a downward pressure (weight) or external force which is met by the internal resistance (stress) of the under object, preserving the same in equilibrium, otherwise the lower object would be crushed.

STRETCHER—A brick or block of masonry laid lengthwise to the wall.

STRIKES—Firms which are constantly at loggerheads with their help, should not be considered desirable insurance as fires may be caused by dissatisfied or discharged employees. See Riot, Strike and Civil Commotion Insurance.

STRINGER—Any longitudinal timber or beam.

STRIPPING in paper box factories, is the gluing together of the ends and sides of boxes. The "stripper" has a glue pot at one end which is heated by steam or gas. If the latter, the glue pot should be "jacketed" and a "baffle-plate" placed under the burners to catch the hot carbon. An operaator sits at one end of the machine and draws a strip of paper over a roller which revolves in the glue pot.

STRONTIA is oxide of strontium, a grayish white substance. No fire hazard.

STRONTIUM NITRATE—Is used in making fireworks to give the red color. No fire hazard by itself.

STRONTIUM ORE—Is used for military purposes in

signal rockets, star bombs and similar apparatus. (No material hazard.)

STRUCTURAL STEEL should be protected with fire resistive insulation such as terra-cotta, concrete or brick sufficiently thick to withstand fire for 2 hours, with a powerful stream of water being applied without being destroyed and thereby exposing the steelwork. Unprotected steel in a building is little better than wood of large dimensions. Underwriters greatly reduce their liability on buildings having unprotected steel or ironwork. See illustrations on pages 650 and 658.

STRUT—A prop, the piece that sustains compression.

STRUT BEAMS—Struts that are also subject to transverse strain.

STRUT BOARD—A board located under the pulley at top of an elevator (lofter) leg and forming part of the enclosure. This board should be slanting to prevent grain or dust from banking up and clogging the mechanism, thereby generating sparks which would ignite the dust or grain. See Breweries.

STRYCHNINE SEED—May not be stored in a stipulated warehouse.

STUCCO—Its composition varies. The following may be used: plaster of Paris, glue, cement, silica, sand or marble dust, sea sand, lime and water.

STUCCO CONSTRUCTION—The old method is to stucco over metal lath, taking the place of clapboards or weatherboards. In the new method, no sheathing is required, the stucco and metal lath taking the place of sheathing or clapboards. The sheathing should be diagonal to the studding to make a firmer brace and prevent cracking, and covered with waterproof paper well lapped, providing the stucco is placed over the sheathing. The waterproof paper prevents the wood from absorbing the moisture from the cement (stucco) which would otherwise prevent proper setting. Wood or metal furring strips fastened 12 to 16 inches over the paper-covered sheathing will fur out the wall and metal lath and allow a proper key for the stucco. Stuccoed walls are a better protection against exposure fires than frame, because *sparks cannot* find lodgment between crevices and it

Courtesy Safety Engineering.

Machine shop before the fire. Note the unprotected steelwork.

Courtesy Safety Engineering

Machine shop after the fire. Note the mass of twisted steel.

will resist heat longer. Dense smoke will color stucco, and cleaning is more difficult than painting a frame building. Not considered much better than frame construction.

Stuccoed buildings are classed as frame.

STUDIOS—Hangings in studios, such as tapestries, portieres, portable scenery and oil paintings, spread fire rapidly. Slight paint and oil hazard. Fair insurance risks.

STUDS—The small size (usually 2x4 inches) intermediate posts in walls or partitions.

STUFFING BOX—The small boxing at the end of a steam cylinder and surrounding the piston like a collar. This box is usually filled with flax or other packing.

STYRAX GUM—Although classed as a gum, it is a dark jelly-like substance. Used in perfume making. Not inflammable.

SUBERINE—Organic thickening material used in calico bleaching.

SUBLIME—To bring by heat into a state of vapor, which on condensing or cooling returns to a solid state.

SUBLIMED SULPHUR—Same as Flowers of Sulphur.

SUBROGATION is the substitution of another person in the place of a creditor, so that the person in whose favor it is exercised succeeds to the rights of the creditor in relation to the debt. More broadly, it is the substitution of one person in the place of another whether as creditor or as the possessor of any rightful claim. The Court of Appeals of New York State defines "subrogation" as the "mode which equity adopts to compel the ultimate payment of a debt by one who in justice, equity and good conscience ought to pay it." In the fire insurance business, the operation of subrogation is used in payment of fire claims to mortgagees.

SUBSTANTIVE COLOR—A dyestuff requiring no mordant.

SUB-STATIONS—See Power Houses.

SUBSTITUTE TURPENTINE—See Turpentine Substitutes.

SUBURBAN RISKS—See Remote Risks.

SUBWAY COMMUNICATION—See Communication by *Subway.*

SUGAR—Usually comes packed in barrels or bags. Sugar stock in warehouses is considered good insurance.

SUGAR HOUSES—Season for operating sugar houses is from frost time to about the first of the year, after which time the plant is shut down, and repairs made, and it remains idle until the next grinding season. There is apt to be a moral hazard where central sugar refineries are present, as quite a number of these sugar houses have been abandoned, especially on small plantations. During the season it is operated day and night, for it is necessary that the cane be disposed of before a frost takes place. Employees are frequently allowed to lodge and cook in the sugar houses. A separate building should be erected for the help, smithy and cooperage. Bagasse is often used for fuel.

SUGAR MANUFACTURING—In obtaining sugar from the cane, the juice is first pressed out between heavy iron rollers. This juice is then cleaned of most of its impurities, and is boiled down to such a degree that the sugar will crystallize as it cools. While this crystallization is going on, a syrup trickles from the sugar and this is molasses. The sugar crystallizes in grains, forming the common brown sugar. To make it white, it requires additional purifying or refining.

SUGAR REFINING—Requires the continuous movements of the sugar in either liquid or solid form through the various conveyors, boiling pans, filters, chutes and dryers. The process consists of mixing, filtering, open boiling, purifying through bone black, vacuum boiling, molding, open-air drying and rotary dryers, cutting, grinding and packing. The **charhouse** where the bone black is prepared should be in a separate cut-off building. Sugar and filter bags should be dried outside of the building. The drying process should always be carefully noticed by the inspector. The grinding produces a dust hazard. See Dust Explosions.

Sugar Refinery (Melter House)—The building wherein the raw sugar is melted preparatory to purifying. Usually, the sugar is conveyed to the uppermost floor by a traveling conveyor, melted in steam tanks and then successively heated in tanks on lower floors to remove some impurities. Floors

are usually coated with syrup, the tanks are set through floors; the sugar bins are of wood, and the building very shafty.

Sugar Refinery (Pan-house)—Sugar is pumped from the charhouse in a semi-liquid state to the receiving tanks, filtered, boiled in vacuum pans and steam kettles, impregnated with sulphur fumes. Then it goes to the mixers and to centrifugal extractors where the liquid is extracted and then to storage bins, and next to separators and granulators (heated by hot air), screened, bagged or barreled or sent to cube presses where it is pressed into cube form, dried by steam or hot air and boxed. Sugar is also pulverized or powdered. Fires due to dust and friction of machinery at pulverizers and powdering machines are frequent. As these machines have suction blower systems, fires may be spread from floor to floor. Dust hazard is also present at granulators and conveyors. The nature of the business requires numerous ducts, pipe openings, hoppers and machinery set through floors which cause fires to spread rapidly. Sulphur storage should be in a separate fireproof compartment. Fires cause considerable loss to sugar in bins, open pans or evaporators from dirt, etc. See Dust Explosions.

Sugar refinery fire, N. Y. Board report, May 25, 1911.

The fire shows clearly the hazard attending the pulverization of sugar and the need for conducting this process in a separate building or the process should be conducted in a section cut off by 12-inch fire walls without direct openings to the other buildings. The outer unexposed wall preferably to be of light material such as plaster on wire lath or terra-cotta blocks, so that the force of any explosion may be vented outward. No dust room should be used. Dust from granulators and pulverizers should be settled by spraying in an enclosed chamber of incombustible material thus eliminating the hazard of dust rooms and dust tubes. All pulverizing mills should be equipped with magnets. Sugar bins should be of incombustible material. See Dust.

SUINT—The natural grease of wool.

SUIT—According to the standard policy no suit or action *for the* recovery of any claim shall be sustainable in any

court of law or equity unless all the requirements of the policy shall have been complied with, nor unless commenced within 12 months after the fire.

SULFONAL melts at 125 deg. C. and boils at 300 C. Is unsafe in a chlorate mixture.

SULFOTHYEL—A gum; used in tobacco to hold the flavor.

SULPHATE—Salts of sulphuric acid.

SULPHATE OF AMMONIA—Made by neutralizing diluted sulphuric acid with carbonate of ammonia.

SULPHATE OF BARYTA—Uninflammable and incombustible.

SULPHATE OF COPPER—Composed of sulphur, oxygen and copper. Usually made from copper scraps, sulphuric acid and water. The process is as follows:

Sulphuric acid is emptied into a lead-lined wood tank from which it is pumped to a wood tank lined with vitrified brick and called a pump tank. Into this tank, copper is dumped where a water spray forms a mixture of copper, water and acid. This mixture is then pumped to the oxidizing tank in order to obtain the proper strength, then passed over to the crystallizing tanks (which resemble plating tanks with copper strands at intervals) where the sulphate of copper crystals form and adhere to the copper strands. The crystals are then taken from the copper strands and placed on top of an open dryer having a perforated top and air blast below. The finished product is then barreled and shipped. The process is not dangerous.

SULPHATE OF LIME—Lime and sulphuric acid.

SULPHATE OF MAGNESIA—Magnesia and sulphuric acid.

SULPHATE OF SODA—Soda in sulphuric acid.

SULPHATE OF ZINC—Is white vitriol.

SULPHATING—Changing chlorides into sulphates.

SULPHIDE—Compound of sulphur with a metal.

SULPHIDE OF SODIUM—Double strength or concentrated sulphide of sodium is not subject to spontaneous combustion in itself, but when the drum is opened there is *danger of spontaneous* combustion. It can be kept in original

packages or drums for years without any fear of fire, but, if this substance comes in contact with loose paper, wood, cotton or other inflammable material, it would be liable to cause a serious fire. The ordinary product (the crystal) contains 9 molecules of water, or in other words, it contains 32 per cent of the anhydrous salt and 68 per cent of water. The double strength product has an extra 32 per cent of water evaporated from it which makes a very deliquescent salt and, when in contact with any other substance containing moisture, it will extract that moisture with such rapidity that considerable heat is generated and there is a possibility of fire taking place.

SULPHO-CARBONIC ACID—Another name for carbon bisulphide.

SULPHO-CYANIDES — Explode when warmed with chlorate.

SULPHONATOR—A cast iron agitating pot.

SULPHONIC ACID—Used in aniline color works, by treating aniline oil or naphthalene with sulphuric acid in closed, steam or gas-heated kettles; diluted, washed and filtered. May nitrate same with sodium nitrate and sulphuric acid or nitration mixture. Can be converted by subliming into sublime beta-naphthol, an intermediate dye product.

SULPHUR—Ignites at about 500 deg. F. Melts at 235 deg. F. When mixed with oxidizing agents, such as potassium sodium, chlorates or nitrates, it becomes explosive. It is highly inflammable; when well ignited burns fiercely, but is not subject to spontaneous combustion except when mixed with other chemicals. Explosions occur in grinding operations due to friction of machinery and dust. Difficult fires to fight owing to sulphur fumes. Firemen must wear masks in fighting these fires. In February, 1919, at 435-41 East 48th Street, New York City, a fire occurred in a large quantity of powdered sulphur in bags. The pungent suffocating fumes disabled over a score of firemen who attempted to enter the building even though they were equipped with gas masks. The sulphur burned and smoldered for nine days although tons of water were poured on it. The sulphur melted and flowed in streams through cracks in the floor, down the side

of the building and into the street. The fire illustrated the danger of storing large quantities of sulphur where it is not easily accessible. (Sunset Warehouse Fire.) See Sulphur Extracting Factories.

SULPHUR BLACK—A coal tar dye used in the hosiery trade.

SULPHUR BLEACHING—See Bleaching Rooms.

SULPHUR CHLORIDE—A yellow liquid. Boils at 138 deg. C. Reacts with water, producing sulphur dioxide, hydrochloric acid and free sulphur. See Water.

SULPHUR COLORS—See Dyes.

SULPHUR DIOXIDE—Formed by burning sulphur or iron pyrites in air. Non-inflammable gas.

SULPHUR EXTRACTING FACTORIES are filled with huge boilers (usually heated by oil fuel), which heat water to nearly 335 deg. F. This is pumped down into the ground through pipes at a pressure of 125 lbs. It melts the sulphur beds which forces the sulphur to the surface by compressed air.

SULPHUR TRIOXIDE—A white solid prepared by passing sulphur dioxide mixed with oxygen over finely divided heated platinum. It has a great affinity for water.

SULPHURET OF CARBON—See Bisulphide of Carbon.

SULPHURETTED HYDROGEN contains sulphur and hydrogen. Inflammable and poisonous gas.

SULPHURIC ACID—It is heavy, oily, odorless, liquid, colorless when pure, but usually yellow or brown due to impurities. It has a strong affinity for water and on account of this it has to be handled with care and if spilled on the skin, wood, fabrics, etc., it will destroy the substance by dehydrating it, leaving a substance mainly of carbon. It is not in itself inflammable nor is it a supporter of combustion. The danger lies in leakage and possible mixture with other chemicals or substances likely to cause fire or explosion. This acid should be stored in a cool place away from the sun and not near other chemicals or waste materials.

SULPHURIC ACID MANUFACTURING—Plants usually consist of three connecting buildings, known as the burner room, tower building, and chamber building with an

adjoining shed used for the storage of pyrites. Manufacturing process: Sulphur dioxide is obtained by roasting pyrites in a brick or iron furnace. The sulphur dioxide mixed with a certain amount of air is carried along a brick or iron passageway where the oxides of nitrogen are supplied by heating filtrate of soda. These gases are passed through dust bins where any dust present is collected. Sulphur dioxide and oxides of nitrogen then pass to the Glovers tower where the oxidation of the sulphur dioxide into sulphur trioxide takes place. The substance now known as nitrosyl-sulphuric acid passes into the lead chambers when water is introduced as a steam jet. The action of the steam on the nitrosyl-sulphuric acid forms sulphuric acid and liberates the oxide of nitrogen. The liberated oxides of nitrogen pass to the Gay Lussac tower where they are recovered and returned to the Glovers tower to be used over. Generally occupy a group of old frame buildings, having large areas. Poor fire record.

SULPHURIC ANHYDRIDE—See Sulphur Trioxide.

SULPHURIC ETHER—Is ordinary ether. It is very inflammable. Boils at 95 deg. F.

SULPHUROUS ANHYDRIDE—See Sulphur Dioxide.

SUMAC—The powdered leaves and bark of an Indian tree, used in tanning. Non-hazardous. See Tanneries.

SUMMER—A large piece of timber supported by piers or posts; when it supports a wall it is called a brest-summer or bressummer.

SUMMER PIECE—The wood or sheet-metal covering placed in front of and covering a fireplace opening. Oftentimes rubbish or paper will be found back of this enclosure.

SUMMER HOTELS—See Seashore Hotels.

SUMP OR SUMPT—A low enclosure or pit to catch waste water.

SUN PARLORS—Are usually constructed of wood and glass and located on top of buildings. Those on club or hotel roofs may be used all the year as lounging and smoking rooms. If not used in winter, they may become the repository for old furniture and odds and ends. Dancing and "*chafing* dish suppers" introduce a mild hazard. Alcohol may

be used as fuel for chafing dishes. They are a menace to firemen because of the danger of falling glass. See Roof Gardens.

SUN'S RAYS focused through imperfect prism or bull's-eye glass, such as in skylights, have ignited celluloid goods, clothing, etc. The fire record shows a number of fires resulting from the action of the sun.

SUNN HEMP—Used in the manufacture of cordage. Classed as soft fibre.

SUPERHEATED STEAM—Is that which is heated apart from its contact with water until it resembles a gas. Used for heating pitch in Breweries and many other purposes.

SUPERHEATER—Used at pitch kettle in breweries for superheating steam coils to melt out all old pitch from kegs. See Breweries.

SUPERIOR CONSTRUCTION—See Fireproof.

SUPERVISORY SERVICE—See sprinklered supervisory service.

SURBASE—The inside horizontal moulding on the wall near the floor.

SURGEONS' LIGATURES—Are made of catgut, treated with chloroform and hermetically sealed with wax in glass tubes. Blow-pipes are used for heating the sealing wax. As the heat is applied near the mouth of the tube, a certain amount of chlorine gas is generated by reason of vaporizing the chloroform. This is drawn off by suction pipes. Culture incubators, cuemol dryers, sterilizers, alcohol stills, and dry box for catgut are gas-heated. Fair insurance risks.

SURGICAL INSTRUMENT MANUFACTURING—Hazards of metal working, annealing, blow-pipes, forges, tempering, nickel-plating, cleaning metal parts with benzine, buffing and making wood handles. At times, have an extensive laboratory for making exhaustive tests. Stock is liable to severe water or moisture damage unless wrapped moisture proof. Good fire risks. (H. G. Boyle.) See Instruments.

SURGICAL SUPPLIES—See Surgeons' Ligatures.

SURVEY—The detail report of a risk made by an inspector.

SURVEYOR—A title applied to insurance inspectors. See Inspectors.

SUSCEPTIBLE STOCKS—See Tobacco. See Tar Paper Mfg.

SUSPENDED FLOORS AND CEILINGS—As the name implies, are those suspended from overhead supports and having lateral braces. The supports are usually iron rods hung from girders. The weakening of one rod or one girder may throw too much weight on the other supporting members and cause the collapse of the floor. Hanging ceilings are ordinarily used to cover large spans and care must be exercised not to place too much weight or strain on any one supporting strut, because if one strut weakens, the entire ceiling may crack and the plaster fall off. If wood lath and plaster, the nails holding the lath in place may rust (one at a time), and finally result in having the ceiling fall. This has happened in auditoriums of theatres and churches or dance halls, and was probably hastened by excessive vibration.

SUSPENDER FACTORIES—The woven rubber and fabric straps are usually made elsewhere. Sewing and assembling present only a mild hazard. Leather parts are cut, sewed, cemented with rubber cement, and at times dressed. Cheap class help employed. Poor fire record class.

SWABBED—A term used in connection with roofing, i. e., roofing felt has been swabbed with tar; waterproof paper between two layers of flooring should be swabbed with tar at joints and at flashings around posts.

SWARF—A trade term for borings from iron or steel. See Iron Borings.

SWEAT-BANDS—Are made of leather. In manufacturing cutting machines, perforators, embossing presses and rubber cement are used. Poor fire record class.

SWEAT SHOPS—A name given to the clothing manufacturing class doing contract work, i. e., making up the garments from goods belonging to dealers who send them already cut to size. Cheap piece-work labor is employed who practically eat, drink and sleep on the premises, and the shops are usually untidy. Smoking, individual motors at machines and cracked pot stoves are the main hazards. Fire

record of class is poor. (S. T. Skirrow.) See Clothing Manufacturers; Contractors; Smoking; also "Goods in Hands of."

SWEEP SMELTERS—Trade name for smelters who buy up the sweepings of gold and silversmiths, and refine it to reclaim the precious metal. The setting of furnaces and kettles should be according to standard rules. The fire record is not good.

SWEEPING COMPOUNDS—The following mixtures consist of various combustible and non-combustible ingredients in such proportions that the fire hazard of the mixture is very small, therefore they are classed as slow-burning—"B. B.," Cedar-sweep, Dust-a-wax, Eureka, Magic, Perolin, Texa-sweep, Tex-o-cide, Violet, Waxolene, Wizard and Floor Clean.

SWEET SPIRITS OF NITRE—Is very volatile at ordinary temperatures. It is composed of ether and spirits of wine.

SWING SAW—A woodworking machine with the saw in the centre of a flat table or stand, operated by swinging back and forth.

SWISS EMBROIDERY—See Embroideries.

SWITCHBOARDS in telephone exchanges form considerable of the value and their number and location should always be specified in the inspector's report. Companies usually limit their liability to a certain amount on switchboards.

SWITCHBOARD MANUFACTURING — Hazards are power-cutting and drilling machines for marble and slate slabs, machine shops, plating, lacquering, enameling, buffing, testing with high voltage electric current and packing material. Good fire record, providing lacquering and other hazards properly safeguarded.

SYLVINE—See Chloride of Potassium.

SYNAGOGUES—The hazards are the same as schools and churches. Scrolls, vestments, parchments, etc., while susceptible, offer good insurance as all efforts are made to recover them in case of fire. Many of the scrolls are priceless and cannot be duplicated. Smoking and candles at altars constitute the principal hazards. See Churches.

SYNTHETIC DYES—The manufacturing process is very hazardous. Many chemicals (such as picric acid for yellow dyes) are the same as those used in making modern explosives. Accommodation class.

SYNTHETIC PERFUMES are those derived from coal tar instead of essential oils.

SYNTHETIC TURPENTINE—An imitation turpentine derived from crude oil. It is used in printers' shops for cleaning type, etc.

SYPHO-CHEMICAL SPRINKLER SYSTEM—Manufactured by the Sypho-Chemical Corporation. Protection from this system consists of a series of sprinkler pipes and heads covering every portion of the building's interior just like a regular sprinkler system. These pipes are filled with calcium chloride, a non-freezing solution, which also has fire extinguishing qualities. The supply tank of 200 gallons' capacity will usually be placed in the basement, though it may be set elsewhere if that location is not suitable. This supply tank is filled with a bicarbonate of soda solution. Attached to it is a syphon chamber containing charges of sulphuric acid. At the top of the riser pipe which extends above the roof is an expansion chamber which, like the pipes, is filled with calcium chloride.

Method of Operation—When a sprinkler head, which has been previously tested and found to properly resist the action of the chemicals, is opened by heat the first discharge is the calcium chloride which is always in the pipes. The fall of this liquid in the expansion chamber causes a suction which is transmitted to the acid syphons, causing a discharge of sulphuric acid into the bicarbonate of soda solution. Chemical force then sends the extinguishing fluid through the pipes as through the discharge hose and nozzle of a soda and acid fire extinguisher. The entire operation is completed in a few seconds. The system is also equipped to turn in fire alarms and warning signals when tampered with. It is claimed for this system that it will make practical the sprinklering of smaller buildings and manufacturing plants. Special emphasis is placed on the efficient fire extinguishing qualities of a soda and acid solution. One sprinkler company

has announced that it does not sell the system, but sells the service of its protection in consideration of an annual charge based upon the area to be protected. This system is designed for use in cases where not more than three sprinklers are expected to control the fire with 200 gallons of chemical solution, and is maintained under a comprehensive service of periodic inspection and expert supervision by the installer. Several fire tests have been given showing that this system will very quickly extinguish a fire composed of motion picture films and pyroxilin waste.

TABLES—To find the circumference of a circle, multiply the diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find area of a circle multiply square of diameter by .7854.

To ascertain the capacity of a cylindrical tank—Example: Tank is eight feet high, ten feet diameter at base, eight feet diameter at top. Take mean diameter which is nine feet. Square the diameter (9 times 9) times .7854 equals the square feet of diameter, times eight feet (height) which equals the cubic feet, times 7.48 (gallons in cubic foot of water); the total is capacity of tank in gallons.

Table Showing Dimensions and Capacity of Standard Water Tank:

Diameter	Height	Capacity
6 feet 0 inches	5 feet 11 inches	1000 gals.
8 " 6 "	5 " 11 "	2000 "
10 " 3 "	5 " 11 "	3000 "
11 " 9 "	5 " 11 "	4000 "
13 " 3 "	5 " 11 "	5000 "
8 " 3 "	7 " 11 "	2500 "
10 " 3 "	7 " 11 "	4000 "
12 " 5 "	7 " 11 "	6000 "
10 " 4 "	9 " 11 "	5000 "
12 " 5 "	9 " 11 "	7500 "
11 " 10 "	11 " 10 "	8000 "

Diameter	Height	Capacity
13 feet 3 inches	11 feet 10 inches	10000 gals.
16 " 0 "	11 " 10 "	15000 "
18 " 3 "	11 " 10 "	20000 "
20 " 2 "	11 " 10 "	25000 "
28 " 6 "	11 " 10 "	50000 "

Cylindrical Tank with Round Bottom—To find the capacity in gallons of the hemispherical portion of a steel cylindrical tank, cube the diameter of the tank (11 x 11 x 11) and multiply by 1.96.

Rectangular Tank—The capacity of a rectangular tank in gallons is found by multiplying its inside length, breadth and height together (to find cubic contents), and dividing this result, if in inches, by 231, or multiplying it, if in feet, by 7.4805. Example: Tank eight feet by eight feet by eight feet. Ascertain cubic feet by multiplying eight times eight times eight, equals 512 cubic feet, times 7.48 (gallons in cubic foot of water), equals capacity of tank in gallons.

Amount of water necessary for gravity and pressure tanks in sprinklered risks—Example: A six-story and basement building; add the number of heads required for each floor and divide by seven (number of floors including basement), to get the average number which we will say is 150 heads. Allow 100 gallons of water for each head, i. e., 150 times 100 equals 15,000 gallons for gravity tanks and one-half that amount or 7,500 gallons for pressure tank. Pressure tanks should be two-thirds full of water and one-third full of air under pressure. Another way to figure, producing the same result would be to average the number of heads per floor (150) and take one-quarter (the number which might be expected to operate at one fire) which equals 37.5 heads. Allow 20 gallons of water a minute for each head (20 times 37.5) which equals 750 gallons per minute. For a fire of twenty minutes' duration (length of time of average small fire) multiply 750 by 20 which equals 15,000 gallons for gravity tank and one-half that amount for pressure tank.

Communicating Buildings—Two buildings may communicate in a standard manner, i. e., with approved fire doors at

each side of each opening. One building may have a floor area of 5,000 square feet, and the other 10,000 square feet. The size of tanks in such a case would be that required for the largest cut-off section (10,000 square feet) which will be considered by most rating bureaus sufficiently large enough to supply both sections. (P. E. Brown.) See Pressure.

T

TAILOR SHOPS—Cut, sew and press clothing. Use gas or electric irons, also benzine for cleaning. Poor class. Accommodation business.

TAILORS' TRIMMINGS—Stock consists of buttons, piece goods, ornaments for cloaks and suits and braids, which are usually kept in tills or pasteboard boxes. Good insurance if well established.

TAKITOF—A paint and varnish remover. Inflammable.

TALC is really ground and refined silax. The silax when mined resembles small stones. It is ground to various grades of fineness. Fans blow the ground material through a series of screens, the lightest, and therefore the best powder being gathered in the last bin. This is called floating. The finest quality is said to come from Italy, although it is also extensively found in France and Canada. If in bags, and piled so that large quantities of water can reach it, as in case of fire, the talc forms a thick pasty mass resulting in a total loss. Fair insurance risks. (Harry Harris.)

TALLOW—A solid fat extracted from the suet of beef or sheep. Melting point 115 to 121 deg. F.

TALLOW DIPPING—Leather for belting is dipped in tallow and hung in rooms to dry. Tallow vats are apt to be heated by open flame fires. They should be heated by steam and should be set on hollow tile or brick.

Tallow Rooms are those in which tallow vats are located or where belting is hung to dry. The hazardous feature about them is that they are usually of frame construction and floors are very heavily coated with the tallow from dripping or spilling of the tallow during process of dipping and drying. A fire in such a room is apt to occur from smoking, matches or tallow in contact with heating apparatus of tal-

low tanks, and if once started would be very difficult to extinguish. Rooms should be of fireproof construction or at least lined on side walls and ceiling with metal lock jointed and blind nailed and the floor covered with heavy sheet metal.

TAN BARK—Spent tan bark is used in white lead works in the corroding building. This material is apt to ignite spontaneously.

TANKAGE (dried blood)—The waste material from rendering plants which is used in fertilizer plants. Non-hazardous and non-inflammable. See Extraction Plants.

TANK FIRES—If the contents of a tank is on fire, it can usually be extinguished if a tight cover is quickly put on, as this shuts off the supply of oxygen. See Oil Tanks.

TANNERIES—Process consists of tanning, coloring, stuffing, oiling, drying, finishing and embossing. Some plants extract grease from wool by the naphtha process. Fires are apt to take place in any of these processes. Lime and tan pits, storage of hides and pickled skins should not be in the main building. All storehouses should be detached. Dry rooms are usually heated by hot air blown from steam coils. If fans are used in dry rooms they should be self-oiling to prevent overheated bearings. In oiling and stuffing, grease is used which should be heated by steam. Floors become very oily from dripping hides hung up after oiling. Lime should be slacked outside of building. Fleshings and scrapings are subject to spontaneous combustion. Buff wheels should have blowers. Hair and wool should be dried in iron textile dryers in a separate building. Lamp-black should be stored outside of main building free from dampness. Bark mill (grinding bark) should be detached. In writing use and occupancy it is well to remember that tanning is a continuous process, and small fires may stop the entire process. In a number of tanneries, employees are permitted to change their clothes in the main buildings. The practice should not be permitted as fires often start from smoking, etc. An outbuilding should be erected for this purpose. Tanning liquors are spoiled by water (which would happen if a fire occurred) in the leach house, and a fresh supply of liquor is not always available. See Hides; see Tanning; also Skins.

TANNERS—Some use a compound of paint containing pyroxilin or gun-cotton dissolved in amyl acetate.

TANNERS' OIL—A by-product of the operation of the tannery.

TANNIN occurs frequently in nature as a constituent of many barks, leaves and wood, and is used for tanning purposes.

TANNING—Is done in three different ways: (1) With tan bark extracts and other vegetable substances containing tannin. (2) With alum or bichromate of potash and other mineral salts. (3) By impregnating or "shamoying" the raw skin and oil. Very nearly every substance contains more or less tannic acid, the active principle in tanning. These tannins may be divided into three groups.

The **vegetable tannins**, viz., the various barks such as oak, hemlock, willow, chestnut, quebracho, etc., the bark extracts obtained from these several trees, quebracho being the one in general use; other vegetable products, some of which are gambier, extracted from the leaves of a tree and imported from Singapore; myrobalans, the fruit of an Indian tree; sumac, the powdered leaves and small branches of that tree, the best variety coming from Sicily. There are also many other vegetable products. Hemlock and oak bark, which were formerly used almost exclusively, are now dividing the field with the bark extracts, among which quebracho and gambier stand out prominently. Sumac is used on sheep skins. Tanning by bark or extracts consists in placing the skins in leaches of these substances, continuously renewed, and leaving them there until the tannin has permeated the hide. They are then removed and washed. The tanning of ordinary skins takes anywhere from thirty to sixty days, depending on the thickness of the skin and various other conditions. Oak tans very slowly, gambier very quickly, hemlock and quebracho in between the two. It takes two years to tan a walrus hide.

The **mineral tannins**, viz., the salts of iron, aluminum, chromium, sodium, zinc, manganese, etc. The ones which are chiefly used are bichromate of potash, common alum and salt. *Chrome tanning*, and indeed salt and alum tanning, are used

to a great extent, almost all of the light weight skins being tanned with one of these substances. The method of procedure in chrome tanning is as follows: After bating, the skins are pickled by soaking in salt and water to which a little sulphuric acid has been added. This serves to arrest any decomposition which may have started and preserves the skins almost indefinitely. They are then put into "pin wheels" (stuff chests) or "Paddle wheels" with the chrome and rolled about for an hour and a half. When taken out they are of a reddish yellow color. Then they are placed in a bath of hyposulphite of soda. This turns them a greenish color, reducing the salt to insoluble chrome oxide; then when washed the tanning process is complete. These processes are not necessarily done separately. In the salt and alum tanning, the skins are simply soaked in solutions of these substances and then dried. Aging these skins makes the tan more permanent and the leather of better quality.

The oil tannins—Cod oil is the only oil with which it is possible to tan. The antelope, deer skin, buck skin and chamois are tanned with oil. Often oil tanning is done in connection with the vegetable or mineral tanning, the skins being partly tanned by the latter methods and then soaked in oil. In oil tanning the skins are soaked in cod oil and rolled in iron fulling machines, similar to the wooden ones in woolen mills, until the temperature reaches about 100 deg. They are then piled in a room and left to dry. Meanwhile the oil oxidizes, the skins turn yellow and the temperature rises to about 180 deg. In this way the commercial chamois is made. They are then again oiled, thrown into hot water and wrung out. A by-product of this process is the semi-solid fat obtained called degras, which is greatly prized by curriers. The sod oil of commerce is also obtained by washing out the superfluous oil with soda or potash. See Tanneries.

TANQUA NUTS—A product of South America; are used for making vegetable ivory buttons.

TAR is obtained as a residue from wood distillation and also from coal. Fires in this material can be readily extin-

guished by covering with sand. Water will scatter the flames. See Coal Tar.

Tar in vats or tanks—If tanks are located in the mill (as in a tar rope factory) fire can best be fought by live steam. To make this effective, the tanks or vats should be in an enclosure. A steam line can be run direct from boiler. The valve on the steam pipe should not be inside the tar room because if the tar vats were on fire no one would venture inside the room.

TARCOLINE—A benzine substitute classed as non-volatile.

TAR PAPER while cooling after being made, sometimes takes fire spontaneously due to chemical changes. Fires in this stock burn fiercely.

TAR PAPER FOR ROOFING—Made by saturating roofing felt (paper) with tar. The paper is made of old rags and paper and sent to the mill in rolls weighing about 500 lbs. These are placed on a reel at one end of a saturating machine, drawn through a trough of steam-heated tar, and rewound on a reel, and then given a final coating. Two ply, or more, paper follows practically the same process. The tar trough is heated to about 250 deg. F. The mixture flashes at about 400 deg. F. When on fire this mixture burns fiercely, emitting dense smoke and intense heat. The paper in rolls, before saturating with tar, if wetted cannot be used as the tar cannot be forced into the pores of the paper. After completion the rolls are wrapped in ordinary paper, with a stick of wood for a core. Slaked lime is used to prevent the paper from sticking when rolled up. If standing on end, water (as from a sprinkler head) will enter the roll and cause adherence, which will greatly reduce the value of the paper, and perhaps make it unsalable.

TAR PAPER MANUFACTURING—Coating is a heavy coal tar oil containing impure carbolic acid, anthracene and naphtha. The liquid will not flash at ordinary temperature, but the vapor given off during coating process is inflammable. The "saturating" machine consists of a steam-heated tank containing the coating material through which is passed the felt paper. A rack, supported by an iron frame, forces

the paper into the coating material. A coated and an uncoated roll of paper are then pressed together. Fires have occurred from static electricity igniting the fumes at the machine. **Susceptible stocks** in the neighborhood of these plants are likely to suffer a severe loss on account of pungent odors from burning tar. See Tobacco.

TARPAULIN—A waterproof canvas used for covering merchandise. It is usually coated with linseed oil. Those used by the Fire Patrol to cover stocks in case of fire are made of brown twill and given two coats of a preparation composed of linseed oil mixed with lithia, which takes 120 days to dry.

TAR POTS, boiling over, have frequently caused fires in buildings in course of construction. When on fire they should be smothered with sand. Water will scatter the burning tar.

TARRED FELT said to be subject to spontaneous combustion.

TARTARIC ACID—Made from crude argol or tartar, or from the mass remaining after wine is removed from the casks. The mass is pressed and dried and used as a basis for making cream of tartar. Fair insurance risks.

TATAIN—A digestive drug. No fire hazard.

TAWS—Is a name sometimes applied to tanning when it is done with alum and salt and can be removed by washing. In this case the leather is merely preserved and the tanning may not be permanent.

TAXIDERMISTS—Stock consists of stuffed birds and animals and is very susceptible to fire, smoke or water. They use glue, cement, excelsior, hair, wood for frames, and shellac. For museum work on large animals the skin is placed on a model of plaster of Paris reinforced with iron and wood strips. The clay is put on about an inch thick, then shellacked and the skin glued on. Glass or celluloid eyes are inserted and nose and mouth retouched with wax. Hand carpenter shop, glue and wax heating, shellacking and stuffing material are the main hazards.

TAX LIEN INTEREST (Double the Regular Fire Rate)—*The form should* read as follows:

On the tax-lien interest of the assured in the building situate No.................

It is especially understood and agreed that it is the intention of this insurance to cover the assured's tax-lien interest in the above-mentioned property, the nature of such interest being transfer of a tax by virtue of the assignment from the City of New York to collect taxes, assessments and water taxes.

It is mutually understood and agreed that if the above-described building is totally destroyed by fire or damaged to such an extent that it must be demolished in order to comply with any law or ordinance of the city, or the owner and or the mortgagees elect not to repair, then this company shall pay the assured the full sum hereby insured, or such a sum as would be sufficient to reimburse the assured for whatever actual loss he may have sustained by reason of such total or partial destruction, this sum in case of disagreement to be determined by appraisement in the manner provided for in the conditions of the policy.

It is further understood and agreed that whenever this company shall pay the assured any sum, this company shall to the extent of such payment, be thereupon legally subrogated to all the rights of the assured under such a tax-lien assignment (or at its option, in the event of the full sum hereby insured being paid to the assured, receive an assignment and transfer of such tax-lien) to the extent of the payment made by this company.

TAXPAYERS—A term sometimes applied to a row of one or two-story buildings erected for store purposes and built to derive enough rent to pay for taxes until such time as a higher building is erected, or the property is sold. Taxpayers are usually a large area with numerous tenants, and hazards of stocks or manufacturing. Tenants are often of "floating class." Keep net liability down.

TEA—Almost as susceptible to smoke or water damage as tobacco. Usually packed in leadfoil lined wooden chests, with or without matting covering and bound with metal bands. For cleaning tea a motor blower "*blender and dust remover" is* used which should have an enclosed fan with

suction to draw off the dust to the outer air. Fair insurance risks.

TEAK—A very durable wood for all work that is exposed to the weather. It contains a resinous oil.

TEAR-OFFS are the portions of the hide or skin which are torn off when they are being stretched. Classed as remnants, and used for horse collars and corners for suit cases.

TEASING MACHINE OR "DEVIL"—Used to break up long tow or fibre to prepare it for the cards.

TEEL OIL—Used to adulterate olive oil. Non-hazardous.

TELEGRAPH OFFICES—Practically an office occupancy with telegraph instruments. Fires are caused by short circuits and messenger boys smoking.

TELEPHONE BOOTHS—Are constructed of wood and glass, sometimes metal lined. A number of fires have started in these booths due to short-circuited electric wires, and careless smokers.

TELEPHONE STATIONS—Good insurance risks. See Power Houses; see Switchboards.

TELL-TALE—It is an electrical mechanism by means of which a test can be made to determine whether the water in the gravity and pressure tanks is high or low. They are not always reliable. Inspectors should satisfy themselves by personal inspection that the water in the tank is at the prescribed level.

TEMPER—If cast iron or other metals are relieved of some of their carbon by heating to "red-heat" with an oxidising agent, it is called tempering. See Hardening.

TEMPERAMENTAL HAZARD—An expression used to denote a certain phase of moral hazard such as bad housekeeping or habitual carelessness.

TEMPERATURE—This question is of vast importance to the fire underwriter. The ignition temperature varies greatly with different materials and with the same materials under varying conditions of pressure, moisture, fineness of division, etc. It does not always require the actual contact of a flame or spark to cause a fire. Radiated heat alone from a burning building, if intense enough, may ignite nearby property.

From observations, temperatures in very large fires aver-

age slightly over 2,000 deg. F. See Chemistry of a Candle. See illustration, page 148. See Flames, also Conflagration Blast.

TEMPERING STEEL TOOLS—The tools are heated to white heat in furnaces, plunged into cold water, then reheated and plunged into fish oil.

TEMPLATE—An iron plate inserted in a wall and on which the floor beams rest which distributes the floor load over a wider area.

TEMPLET—The outline of a moulding cut out of wood or sheet iron.

TEMPORARY KEROSENE OIL BURNERS (in fire boxes of coal stoves)—See Kerosene Burners.

TENANT (Manufacturing)—See Omnibus Manufacturing.

TENEMENTS—Buildings classed as tenements are occupied by three or more families. The New York City law states that in rooming houses or other buildings occupied by more than two families there shall be no cooking unless the buildings are classed as tenements. This is to offset the number of fires due to "light housekeeping" in theatrical or other rooming houses. See Apartments.

TENON—A projecting tongue fitting into a corresponding cavity called a mortise.

TENONING MACHINES—Woodworking machines; produce considerable refuse.

TENSILE STRESSES tend to pull fibres of materials apart.

TENSION—See Compression.

TENTERING MACHINE—A long iron frame with carriers for conveying piece goods from one end of machine to the other. The goods first pass over a steam box and steam permeates the goods, then over a number of gas burners which dry the goods, and finally over or under a steam-heated drum. The operation shrinks the goods.

TERCERA—A roofing compound made of chalk, tar and sand.

***TERCHLORIDE* OF NITROGEN**—An explosive *compound.* See Nitrogen Chloride.

TEREBENTHENE—A hydrocarbon derived from oil of turpentine.

TERMINALS—See Railroad Terminals.

TERPENES—Volatile oils of coniferous resins.

TERRA COTTA—A fine quality of clay. The highly ornamental terra-cotta fronts of buildings are easily damaged by fire. Porous terra-cotta tile, used in building construction, is porous as compared to hard or dense tile. Sawdust is used in its manufacture, which burns out, leaving pores. Under intense heat the faces of terra-cotta tile blocks crack badly and fall away. Storage of terra cotta packed in hay or light material in large area frame shacks is not considered desirable insurance. See Tile. See Tile Works.

TERRORALL—A high explosive, more violent than TNT.

TESSELATED FLOOR—One formed of small blocks of wood or mosaic work.

TETRACHLORIDE OF CARBON—See Carbon Tetrachloride.

TETRACHLORIDE OF TIN—A crystalline solid. Not hazardous. This liquid is obtained by heating metallic tin with chloride of mercury, and condensing the fumes produced, or by passing a current of dry chlorine over melted tin, and condensing the resulting chloride. When mixed with water, great heat is generated. Used by dyers.

TEXACO SPIRITS—A benzine substitute, classed as non-volatile. Classed with turpentine. Flash point about 90 deg. F.

TEXAS—A large frame roof structure or room, smaller in area than the roof itself, having one or more stories in it. Sometimes called a lantern.

TEXENE—Turpentine substitute, flash about 90 deg. F. Classed with turpentine.

TEXTILE pertains to woven fabrics or fibres or a material suitable for weaving.

TEXTILE FABRICS—All woven or piece goods.

TEXTILE FIBER—A wool is so called.

TEXTILE MACHINERY—Any machine connected with a fabric weaving process.

TEXTILE MILL—A factory where fabrics or fibres are woven.

THATCH ROOFS—Consist of bundles of wheat straw. Used for decorative purposes on summer cottages.

THEA BUTTER—Similar to palm or cocoanut oil.

THEATRES (Stage Building)—Usually a high one-story building equal to 6 stories, with a deep basement. Walls should be of brick or concrete at least 16 inches thick, parapetted and coped. The roof should have either brick, concrete or terra-cotta arches. The roof topping should be tile or plastic slate, the cornice brick or tile, and the windows of wired glass in hollow metal sash and frames. Shutters, if any, to be standard lock-jointed. The floor wings each side of stage to be of brick, tile or concrete arch, supported by protected iron columns or brick walls. Wood flooring is permitted only on the working part of the stage (center). The fly galleries, which are located at the sides and over the stage, should be constructed of fireproof arches. These are used to handle the drops, etc., and are at quite an elevation above the stage floor. The painters' bridge is always located against the rear wall of the stage, connecting the fly galleries. This should be of steel slats laid about 2 inches apart. Above the fly galleries, about 5 feet under the roof is the gridiron (sometimes called rigging loft), built entirely across the stage.

Proscenium Wall—This separates the stage, the real hazard of a theatre, from the auditorium section. The proscenium wall (between the stage and auditorium) should be of brick, thickness the same as the outside walls, but never less than 12 inches, with 4-inch pilasters, and should extend the entire width of building. It must start at the ground, and extend at least 4 feet above the auditorium roof. The stage building wall should be parapetted 4 feet. The steel girder over the proscenium opening must be protected with at least 2 inches of Portland cement concrete. There must be a relieving arch in the proscenium wall over the girder. This is compulsory as it relieves the girder of the weight of the wall. *The proscenium wall under the stage should extend to the under part of the stage floor level, or flooring should be cut away the width of the curtain and filled in with concrete.*

This would form a complete separation of the stage floor from the apron. The only openings allowed in the proscenium wall should be the curtain opening and not more than two others, to be located either below the stage level,

Courtesy N. Y. Fire Prevention Bureau.

Model Theatre showing Fire Protection Methods

or one on either side of the stage on first floor; no opening of any kind should be permitted above the first floor. Openings are not to exceed 21 square feet, each with 3-inch standard double lock-jointed, tin-clad fire door on each side of the wall. Only one standard automatic fire door is required at *opening to musicians' pit*. The proscenium frame should be

of non-combustible material, i. e., wire lath or plaster, stucco or concrete.

Skylights over stage—Thin glass on metal frame skylight, at least one-eighth the stage area, should be installed. To be fitted with rolling sash and glazed with glass 1/8 inch thick and no one to exceed 300 square inches. Rolling sash should be fitted with brass wheels not less than 2½ inches in diameter; the latter should roll on a brass plate on an iron frame extending entire length of sash. The skylight must be set on curb so that the lowest portion of the tracks will be not less than 12 inches above the roof. The angle of the skylight frame to be on basis of 1 inch rise to 1 foot length. The skylights to be constructed so as to open instantly on the cutting or burning of a hempen cord which should be arranged to hold the skylight closed. The said ropes should come together at the first fly gallery by iron triangle and then by single rope to stage floor. Skylight frames to close under metal hood at top, sides and bottom with metal aprons lapping 4 inches downward to prevent the elements lodging on same. Several entirely different types of "theatre skylights" are now on the approved list. Theatres should be carefully surveyed for the protection and construction of the proscenium arch. The fire record of the modern fireproof theatre is good, while that of the old non-fireproof type is poor. See Asbestos Theatre Curtains; see Lash Line.—C. C. Dominge, in the "Weekly Underwriter."

THEATRICAL TENANTS—Usually not attractive insurance risks unless well known and at the top in their profession. See Actors; see Furnished Room Houses.

THEATRICAL WAREHOUSES—Are those housing the scenery, properties, costumes and stage equipments of theatres. Such work as costume repairing, painting, repairing may be done on the premises. Liable to be a menace to surrounding properties if on fire. Undesirable insurance risks.

THERMIT—A mixture of aluminum and iron oxide. It may be ignited by means of a special powder and on reaction it produces superheated liquid steel and slag of aluminum oxide at a temperature of about 5,000 deg. F. The steel is sufficiently hot to melt and dissolve any metal with

which it comes in contact and it unites with the metal thus dissolved to form a solid mass when cool.

THERMOSTAT—A self-acting apparatus for regulating temperatures by the unequal expansion of different metals by heat. See Alarm, Automatic.

THIMBLE (sometimes called a "sleeve" or a "bushing")—Is made of perforated or plain, single or double pipe, and is used for fire protection when placed about a smoke pipe which passes through a partition or roof. Should be eighteen to thirty-six inches larger in diameter than the pipe enclosed.

THOR IRONER—A gas-heated ironer used on cloth, similar in appearance to a gas-heated mangle. It is operated by motor. The machine consists of an iron roller wrapped with burlap, mounted on an iron frame. At the back and nearly touching the roller is a crescent-shaped sheet of iron which is heated by a row of gas burners running along the entire length of roller. At back of gas burners is a metal shield (perforated) to bank up the heat. As the goods are passed over the roller they run between the roller and the iron plate which irons out the goods.

If the gas burners are lighted, and the rollers not revolving, the iron plate will become sufficiently hot to set fire to the burlap wrapping wound around the roller.

THORIUM (nitrate of), Manufacturing—Monasite sand is first placed in an iron cylinder "ball-mill" and reduced to extreme fineness, then put in direct fire furnace kettles, then mixed with sulphuric acid and boiled, becoming a sulphate of thorium. At this point it is treated with various chemicals (caustic soda, sulphate of soda, oxalic acid, oxalate of ammonia and carbonate of ammonia) and by pressing into cakes passes from an oxalate to an ammoniate. These stages are by agitation, settling and pressing, during which there is an "off product" containing thorium. The ammoniate of thorium is then treated with sulphuric acid and allowed to crystallize. The crystals treated with nitric acid leave white salt. It does not burn or support combustion, but heat gives off nitric acid and becomes oxide thorium *(incandescent)*.

Reclaiming thorium from discarded mantles or clippings from new mantles. They are very brittle and are received from concerns who make a business of collecting them. The mantle dust is washed and filtered in water in stone tubs, then boiled in a thin solution of sulphuric acid and water, then treated with pickling solution of anhydrous ammonia, sulphuric, acetic or nitric acid. Ammonia is added to crystallize the sediment. Product is then in crystal form, which is put in porcelain cups and dried over a gas burner. Gas heat is used for boiling and drying cups. Storage of acids important.

THREAD WORKS—The thread is spun at spinning mills and skeined. It is received in this form at the ordinary thread mill where it is wound on spools. The spools are either wood, or "tubes" made of cardboard. Cotton thread is "silk finished" on a "dressing-machine." The thread is on reels on a frame, drawn through a sizing tank, then over a hair-covered, steam-heated iron drum which dries and polishes the thread, after which it is respooled. The sizing is made of gelatine or glue, borax, dextrine, starch, water, cocoanut or other similar oil. The sizing kettle should be steam-heated. The steam pipes at machine are apt to become covered with fine dust or "fly" from the thread and should be cleaned often. Fair insurance risks.

THRESHERS should be equipped with an effective fire extinguisher, smut or grain-dust collecting fans and machines should be electrically grounded with copper wires. See Grain Fires.

THROWSTER—One who throws, twists or winds silk.

THUMB RULE OF BUILDING VALUES—See Appraisals.

TIE-BEAMS—Ties that are also subjected to a transverse strain.

TIER—Applied to merchandise, boxes or barrels which are piled one on top of another, each layer being a tier.

TIERCE—A cask holding forty-two wine gallons. A provision cask made in two sizes, viz., 304 lbs. and 336 lbs.

TIGERS—See Plush.

***TILE* (dense or hard)** is stronger but more brittle than

porous tile. When suddenly cooled after being subjected to intense heat on one side only (as would usually be the case in actual fires) is liable to crack and even the lower webs fall because of the uneven expansion or contraction. It is used largely for floor arches.

Tile (Porous)—Superior to dense or hard tile; it will endure unequal heating and sudden cooling without cracking. In its manufacture sawdust and cut straw are mixed with the clay and these being consumed in the kiln leave small air spaces. Being lighter, it is given heavier webs and bulk and is naturally an advantage where heat absorption is concerned.

TILE WORKS—In brick and tile works, dryers about 6 feet high, 8 feet wide and 100 feet long are used, built of brick and iron frame, heated by a furnace located at one end and below floor level, or it may be heated by heat passing off from kilns. Tile or brick is put on boards, called "pallets," placed on racks on cars, and run slowly through this tunnel. Fires are caused by racks becoming very dry, due to alternating moisture and heat, and the rapid absorption of heat causes the wood to ignite spontaneously. The lowest pallet becomes heated very rapidly. Poor fire record.

TILLS as applied to stocks refer to wooden drawers or bins. The lowest row should be at least 6 inches above the floor.

TIMBER—Heavy timber resists fire better than small iron columns. When superficially charred, the coating does not necessarily weaken the timber. See illustration, page 690.

TIME FUSES are sometimes filled with nitric acid, gunpowder, etc.

TIN—Recovering tin from used cans. An air-tight masonry room is filled with cans, and warm chlorine gas forced into the room, which unites with tin and forms tin chloride (highly volatile). The gaseous mixture (free chlorine, air, and vapor of tin chloride) passes through a condenser where the tin chloride is separated from the other gases, and by a chemical means, pure tin is precipitated. In sheets, tin will *sustain considerable* water damage unless each sheet is thor-

oughly dried immediately after becoming wet. Melts at 450 deg. F.

I. C. Tin—This term is used to denote the covering to lock-jointed fire doors. I. C. tin is charcoal iron, i. e., iron with the charcoal removed.

Courtesy W. S. Lemmon

The effect of fire on steel and wood beams. Note the twisted steel. The strength of the wood girders is unimpaired

TINCAL—See Swab.

TIN-CLAD FIRE DOORS—See Fire Doors.

TINFOIL is melted pig lead, antimony, and block tin. *The alloy* is cast in slabs, and rolled out in plates or sheets.

The machinery consists of furnaces, heavy and light rolling-machines and cutters, presses for coloring and printing. Good insurance risks.

TINDER BOX—An apparatus which consists of a piece of steel, a flint, and some half-burned rags in a tin box, together with some splints of wood tipped with sulphur.

TIN PLATE consists of iron or steel rolled into very thin sheets, coated with a composition of tin and lead.

TINSMITHS have caused fires in buildings by leaving gasoline torches unattended when lighted. In shops, may use gas-heated soldering mufflers, gasoline torches, sheet-metal cutters; paint. Susceptible to water damage. Fire record is fair.

TIRE PITS—See Wheelwright.

TITAN POWDER—A form of dynamite.

TITANELLO—See Titanium.

TITANIUM—A mineral ore, used in the manufacture of ferrotitanium and ferro alloys. It is imported from Canada and Norway and also found in Florida. Prepared grades of titanium oxide are sold under the trade name of Titanello and are used in pottery work.

TITLE (Form of)—Many contracts read: "On property of John Doe & Company and/or as agents, for account of whom it may concern. Where this form of title is used, most companies prefer to have the loss, if any, adjustable with and payable to a specific party, and generally decline the risk unless corrected as mentioned.

TNT—See Trinitrotoluol.

TOBACCO—As a general rule tobacco is very susceptible to smoke and water. Some tobaccos offer practically no salvage as in the case of Sumatra leaf. Havana filler is tougher and offers more salvage than most other leaves. The damaged leaves, however, have some little value as fertilizer.

At a recent fire, in a burlap bag risk adjoining a tobacco warehouse, tons of water were poured to drown the fire. The moisture penetrated the walls of the warehouse and a large loss was paid on tobacco. Tobacco should not be *stored in basements* against the walls of the building. See *Cigarette Making;* see Tar Paper Manufacturing.

TOILET ARTICLES AND PREPARATIONS—Work consists of making cosmetics, face creams, pomades, nail buffers, nail polish; wood, celluloid or metal articles, and packing powders. Use cologne spirits, alcohol, glycerine, Russian white oil, vaseline, petrolatum, vegetable oils, waxes and clay. Hazards of woodworking, metal working, celluloid working; powder grinders, sifters and mixers; stoves for wax and oil heating, benzine for cleaning metal parts, painting and varnishing wooden parts. The disastrous explosion in the laboratory of the Colgate plant in Jersey City, January, 1919, is attributed to the large amount of ether being used. The vapor is supposed to have been ignited by an electric spark. Quick burning risks. Fire record is fair.

TOLUENE—Same as Toluol.

TOLUOL—Coal tar distillate, boils at 230 deg. F. Vapor very inflammable, smells like benzine, but not as dangerous to handle. Solvent for fats, rubber and resins. It is the basis of the explosive called trinitrotoluol, more familiarly known as TNT. The Ordnance Department of the United States Army says that this was the best explosive for our use in the war, as it is manufactured and transported with comparative safety and is a very effective destructive agent.

TONGUE—A ridge worked on the edge of a board to fit in a groove.

TONITE—Similar to Gunpowder.

TOOLS AND INSTRUMENTS of all kinds, if polished, are easily damaged by water. Their value, as far as sale is concerned, is thereby lessened. See Hardware; see Cutlery.

TOPOGRAPHY OF LAND—Very important to the Underwriter in considering surburban or "out of town" properties. All hilly or inaccessible sections should be noted with advices as to kind and condition of roads, whether fire apparatus can reach the risk and if the fire hydrants are adequate. See Accessibility.

TOPPER—A top or side label finisher machine for gluing or pasting labels on paper boxes. Sometimes gas heated glue pots are used.

TOP-RAIL—The upper rail of a door or sash.

TOW—After such fibres as hemp, jute and the like are put through the cleaning process, the residues left are known as tow, a ligneous product used by upholsterers. Tow is dangerous inasmuch as it will glimmer at about 257 deg. F. and is therefore one of the most easily kindled of fibres. This material in large piles is apt to give off certain gases during storage, which gases when mixed with dust and ignited by contact with a flame produce a violent explosion.

TOY CAPS consist of small portions of a mixture of antimony, sulphide, red phosphorus and potassium chlorate between two layers of paper. They do not ignite spontaneously.

TOYS (metal) Manufacturing—Hazards are machine shop with numerous heavy and light stamping presses, cheap paints, soldering, lacquering and japanning. A poor fire record class. See Celluloid.

TOY TORPEDOES—Contain red phosphorus and chlorates.

TRACK TORPEDOES—Consist of hollow discs filled with a mixture of sulphur, potassium chlorate and sand or gravel.

TRADE NAMES often hide the identity of the owners who may have bad fire record or poor financial record.

Trade Names for nitrocellulose compounds are Viscoloid, Pyroline, Fiberloid, Galillith and Pyralin.

TRADE REPORTS—These reports assist the Underwriter or Examiner to intelligently pass or reject a line. They give a brief outline of an assured's business career including failures, antecedents, fires, standing in the trade and credit. See Blank Rating; also Branch Stores and Mercantile Reports.

TRAIL—The pipe from the reservoir to the intake of a pump; should not be over 25 feet long.

TRAIN OIL—Obtained from the blubber of the whale.

TRANSEPT—One of the lateral members or projections between the nave and the choir of a church.

TRANSFORMER—A device acting by induction to lower or raise the voltage of an electric circuit. There are 2 kinds of transformers, those which "step-up" or increase the volt-

age and those which "step-down" or decrease the voltage. In the latter case the wires leaving the transformer should be heavier.

TRANSIENTS—Guests staying less than one week are considered transients, except where occasionally staying as a guest of a permanent occupant. Some rating bureaus make a charge for this feature in rating hotels and kindred risks.

TRANSIT CLAUSE—This clause covers the goods being brought to or from lower floors of a fireproof building to those occupied by the assured. When writing insurance covering contents of a fireproof building (unless sole tenant), underwriters require the floors on which the merchandise is located to be stipulated in the policy.

TRANSITE BOARD—Made from sheets of asbestos and soluble glass pressed together.

TRANSLUCENT FABRIC—Is a wire gauze cloth covered by a layer of solidified linseed oil which penetrates between the meshes. It is used for skylights. Process consists of dipping the wire fabric several times into linseed oil until covered to the required thickness.

TRANSOM—A beam over the opening for a door. Transom light is the glass window above. In Fireproof buildings, all transoms should be wired glass in hollow metal frames.

TRANSPARENT LEATHER—Ordinary skins are shaved, cleaned, stretched on frames and rubbed with glycerine, salicylic, picric and boric acids.

TRANSPARENT SOAP is ordinary soap mixed in hot alcohol.

TRANSVERSE SECTION—A drawing showing a section across the object.

TRAPPED—A floor opening is trapped when it has a door which can be raised or lowered so as to completely close the opening. Automatic traps are those held open by rope and fusible link. Many bad fires are checked by the closing of "trap doors" to stairway and elevator shafts. See illustration, page 273

TRAP-ROCK—On account of its strength and its fire-re-

sisting properties, is considered the best of the stones for use as aggregate in concrete making.

TREATING SILK RIBBONS, see Sizing Silk Ribbons.

TREATY COMPANIES—Re-insurance companies who by agreement accept a percentage of lines taken by a company on any and all kinds of risks.

TRESTLE—A braced framework for supporting sprinkler or water tanks, stringers of bridges, etc.

TRIATOMIC ALCOHOL—Glycerine.

TRIM—Woodwork used for wood finish. It is now being replaced by metal-covered or kalameined-covered wood. Wood trim, in fireproof office buildings tends to cause a fire to spread.

TRIMMER—A short cross timber framed into two joists to sustain the ends of intermediate joints. Example: The trimmer in arch under hearth to prevent joists from entering the chimney breast. See illustration of chimney, page 119.

TRIMMINGS—Most stocks contain bright colors which run when wet, or the goods may be drawn entirely out of shape. Very susceptible. Good insurance risks.

TRI-NITRATING is a very hazardous process.

TRINITROBENZOL, compound, when dry is a high explosive. When wet with not less than 20 per cent water and in water-proof containers, may be shipped as an inflammable solid.

TRINITROPHENOL (or picric acid)—A very powerful explosive used in military work under the name of Melinite, Lyddite or Shimmse. (See Nitrobenzole.)

TRINITROTOLUOL (TNT.)—A pale, yellowish, finely crystallized substance somewhat resembling brick dust or powdered rosin, made by treating toluol, one of the lightest distillates of coal tar, with strong nitric acid in three successive operations. It takes fire and burns at about 480 deg. F. When heated by a fire it may explode with tremendous violence. (W. D. Grier.)

TRIPOLI—Buffing wax, composed of decomposed silica, iron oxide, paraffine, mineral colors, rosin, lamp-black, Vienna lime. This lime is unslaked lime with 40 per cent magnesia. *and is not dangerous.*

TRIPOLI POWDER—A polishing powder of animal origin. Rags saturated with this material are said to be subject to spontaneous combustion.

TRITURATION—A grinding or rubbing process in order to reduce substances to a very fine powder.

TROCHAS SHELLS are imported from Fiji Islands, and are used for making buttons.

TROMMELS are graded cylindrical sieves used for separating and sizing the ore from the crusher.

TROTTER OIL—Made by boiling sheep feet, called hair oil.

TRUNKS AND BAGS, (Manufacturing)—Use wood, leather, imitation leather, fibreboard or fibre for covering. Woodworking, glue heating, cabinet work, caul boxes, dry-rooms, veneering; enamelling, japanning, painting, varnishing (using benzine as thinner), metal working, soldering. Celluloid articles for trunk accessories. Shops are crowded, as a rule. Fire record of class is poor.

TRUSS—Timbers assembled for supporting purposes.

TRUST—See In Trust.

TUBING—See Flowers and Feathers.

TUBULAR BOILER—See Fire Tube Boiler.

TUMBLER (for polishing metal or other wear) is usually a barrel in a horizontal position on an inclined axis with sawdust, carborundum or sand inside.

TUN—Large cask, usually contains liquor.

TUNG OIL—See China Wood Oil.

TUNGSTATES of sodium, potassium and molybdenum are used for fireproofing inflammable material.

TUNGSTEN—A heavy steel-gray metallic element, used extensively in making incandescent lamps. It is a deposit in rock formation, and is blended with steel for use in armor-plate and projectiles; it is used as a mordant in dyeing; in calico printing; fireproofing vegetable fibres; as an alloy with aluminum, copper, nickel, titanium or zirconium; as filaments for electric lamps.

TURKEY RED—Same as Alizarin.

***TURKISH* AND OTHER BATHS**—The setting of boiler, *which is* usually high pressure, is important; also clearance

of all woodwork around steam pipes. Majority of buildings are converted dwellings, or of similar construction, divided into many small rooms used as dormitories. Hazards are swinging gas brackets, portable gas radiators, and smoking by patrons. Considered fair insurance risks.

TURMERIC—A yellow dye used in printing and dyeing silks.

TURNOVER—A business term applying to the value of the produce sold.

TURPENTINA—A substitute benzine, which is composed of turpentine and benzine. It is used largely by printers for cleaning presses.

TURPENTINE is distilled from crude resin, the sap of fir or pine trees, and flashes at 92 deg to 104 deg. F. When brought in contact with a mixture of muriatic or nitric and sulphuric acids it takes fire. It is sometimes adulterated with crude petroleum and benzine. An odorless turpentine has been produced from sulphate turpentine, a product in the manufacture of sulphate pulp. Substitute turpentines are usually petroleum distillates with a flash point below 80 deg. F.

TURPENTINE (Mineral)—The spirit or most volatile part of the native rock oils, or from artificial paraffine prepared from coal and shales. Volatile and highly inflammable.

TURPENTINE OIL is obtained from the resinous exudations from the wood, bark or leaves of pine or fir trees. It is volatile, giving off inflammable vapors at about 95 deg. F. Burns with a smoky flame because it contains considerable carbon. When heated with iodine it detonates and causes fire.

TURPENTINE SUBSTITUTE is generally a highly inflammable petroleum with a low flash point. Texene and Texaco spirits are classed as little more volatile than turpentine, flashing at about 90 deg. F. Special spirits, Paint Thinner, Turpoline, Mineral Turpentine are all substitutes.

TURPENTINE TANKS—Several fires have occurred, probably from static electricity, where tanks were being filled with turpentine, which was being poured through a brass wire strainer. See Static Electricity; see Oil Tanks.

TURPENTOLE—Distilled from paraffine; a highly inflammable spirit.

TURPINO SPIRITS—Flash at 112 deg. F.; an acceptable benzine substitute.

TURPO SPIRITS—Flashes at 98½ deg. F. by open cup test. Classed as volatile and inflammable.

TURPOLINE—A turpentine substitute. Inflammable.

TURPOZINE—A substitute for turpentine which has a high flash point. It is classed as non-volatile.

TURPS is the abbrevation for turpentine.

TURPSITINE—Flash 105 deg. F. It is classed as non-volatile.

TURP VARNISH is made from soft gums.

TUTONITE—A mixture of chlorate of potash, charcoal, saltpetre and gum. It is used for blasting purposes.

TUXY—The thin ribbon which contains the cordage fibre is known as the tuxy.

TWIN-BEAMS—Two beams of same dimensions laid side by side on edge.

TWIN-GIRDER—Same as twin-beam, but larger.

TWO-WAY HYDRANT OR FIREPLUG—One which has two hose connections. See Siamese.

TYPE-CLEANING COMPOUNDS—None but approved makes should be used, as many contain naphtha or other volatiles.

TYPESETTING—See Composing.

TYPEWRITER INKS AND RIBBON—Ink factory hazard. Employ grinding mills for ink, steam kettles, laboratory for testing, mills and mixers. They may use lard oil, cottonseed oil, alcohol, benzine, sulphuric and nitric acids, etc. In the ribbon department the machinery consists of ribbon-winding wheels, eyeletting machines, ribbon inkers (cold), knitting looms, steam baths, drying machines (gas heat), singeing machines (gas blow-pipe arrangement), extractors and steam-heated rolling-machines. These risks burn fiercely with heavy dark smoke and are serious exposures to surrounding properties. Accommodation business. *See Carbon* Paper.

***TYPEWRITER* MANUFACTURING**—Mainly a foundry

hazard including type making, machine shop with welding, brazing, and japanning by dip process. Hazards are rubber key-pad and roller making (including vulcanizing) and use of rubber cement; woodworking; cutting, sewing covers, extensive repair shops and benzine for cleaning oily parts. Considered good risks if hazards well safeguarded.

U

ULMATE OF AMMONIA—Product in the form of a dark powder intermixed with dust and grit resulting from the crushing of mixed rags. It is not subject to spontaneous combustion.

UMBRELLA MANUFACTURING—Work consists of making sticks or handles, wire ribs, cementing handles on sticks and covering the frame with fabric. Handle and stick-making involves wood and metal-working and silversmith work. The handles are cemented on sticks with carnauba wax, varnished, and the metal parts plated and buffed. The horn used for handles is heated over a gas flame for working into shape. It is cut, bored and polished. The fabric is sewed by hand or power-machines. They sometimes used benzine for removing spots from fabric. Celluloid hazard important. Accommodation business.

UNBROKEN AREA—An area with no subdivision walls or fire-resistive partitions, and where fire could have a full sweep. Underwriters usually carry low lines on risks having large unbroken areas. See Area of a Building.

UNDERGROUND WORK—See Contractors.

UNDERMINE—To excavate beneath anything. This work is going on continually in subway-building. The company should be notified whenever this work is to take place.

UNDER-PIN—Adding to the height of a wall already constructed by excavating and building beneath. Also to introduce additional support of any kind beneath anything already completed. The company should be notified whenever this work is to be started. See Builder's Risk.

UNDERTAKERS—Hazards are casket-lining, stuffing, embalming and varnishing. They use a small amount of muriatic, acetic and sulphuric acids, alcohol, and formaldehyde in embalming work. Good risks, if well established.

UNDERWRITERS—Those who fix the limit of liability which a company will assume on the various classes of risks, and who pass on the desirability of such business offered to the company. They should be of pleasing personality so as to encourage placers and others to do business with the office they represent. See Map Clerk.

UNDERWRITERS' LABORATORIES—Tests are made to establish the relative fire strength of materials and devices for insurance purposes. It is an institution supported by stock fire insurance companies of the United States. Inspection is also made at the shops of manufacturers, and labels issued by the Underwriters' Laboratories are affixed to the appliances as evidence of compliance with standards.

UNDERWRITING—Increase of lines and resulting premium, rather than indiscriminate cancellations, is what pays. An ideal risk is scarce, and with proper regard of hazard and line, the best underwriter is one who has the good judgment to select such risks as will yield an underwriting profit, basing such judgment on the loss ratio of that particular class; or his knowledge of hazards when the risk offered is an exception.

Successful underwriting requires knowledge of hazards and construction from personal inspection, familiarity with local conditions, fire and loss costs of various classes of risks, the adequacy of rates, trade conditions, and common sense.

Conditions and hazards in all manufacturing processes change, usually for the better, as years advance and a more intimate knowledge is had, and a more minute study of processes is made, to reduce producing costs. Probably the best example of this is in the shoe industry. Only a short time ago this class was tabooed by most underwriters on account of the fire record of the class. The manufacturers were charged very high rates and only small lines were written by individual companies. With increased knowledge as to hazards, such as the handling of rubber cement and benzine, cutting-board scrapings, etc., the hazards and also the fire loss and rates were greatly reduced. Breweries and woodworkers were in the same class. They now show a profit.

The following **construction features** are always noted by experienced underwriters before passing lines:

Frame Buildings—Fire stops in side walls. Roof space communications. Kind of division walls.

Brick Buildings—Thickness of floors; protection to floor openings; kind of roof; window protection.

Mill Constructed Buildings—Thickness of floors and roof; spacing of bays; protection to floor openings; window protection.

Fireproof Buildings—Protection to ironwork; protection to floor openings; scuppered floors, window protection. See Upper Floor Contents; also Accommodation Line; see Authorizations; also Average Risk.

UNDISCLOSED INTERESTS, such as **"for account of whom it may concern,"** etc., should always be investigated before line is passed. The loss records show many transactions which should have been carefully investigated before the fire.

UNEARNED PREMIUM—That portion of the premium which is returned to the insured in case of cancellation of the policy. It represents the premium for interim between the date of cancellation and date of expiration of the policy.

UNEARNED PREMIUM RESERVE is the amount of premium received by an Insurance Company which has not yet been earned by them and is set aside by them to take care of the policies in force. It is apportioned to the company's surplus each year, after the expenses and losses have been subtracted. It is generally figured as follows:

It is usually assumed that the entire premiums of the company written in any one year were for policies taking effect June 1st. These premiums are divided into three accounts: one year, three years and five years. Anything less than one year goes in the one year column; anything more than one year goes in the three year column, unless it is more than three years, in which case it is placed in the five year column. Each year on June 1st, the pro rata amount of premium earned in each of these accounts is subtracted from the reserve and likewise the full amount of *new premiums* written during the fiscal year is added. Allow-

: is also made for cancellations or reductions of rate. T. Skirrow.)

NIFORM MANUFACTURING—See Clothing; see s and Caps Manufacturing.

NINSURABLE PROPERTY—The policy is worded as ›ws:—This policy shall not cover accounts, bills; cur- :y, deeds, evidences of debt, money, notes or securities, unless specifically named thereon in writing, bullion, .uscripts, mechanical drawings, dies or patterns.

NIT SYSTEM of construction is making each building each floor of each building a separate fire risk.

NIVERSAL MACHINE—A woodworking machine of :nted type capable of performing different kinds of work. general, it is a combination of jointers and borers with ıdrels for saws. It produces considerable refuse and ıld have blower attachments.

NOCCUPIED BUILDINGS—Unoccupied is construed nean a building that is entirely furnished, but with per- ıl habitation temporarily absent. Such buildings rapidly :eciate in value. Those without caretakers, especially ıcated outside of protection, are not considered favorably most companies. Should be considered as serious ex- ıres as tramps or mischievous boys may gain access and fire to the building. If unoccupied for more than 10 s the insurance is null and void unless agreement in ing is attached thereto. (F. W. Mayes.) See Vacancy.

NPROTECTED—Without Fire Department, fire wall, door or fire appliance service.

NPROTECTED IRON—See Steel (for protection).

NSLAKED LIME—See Lime.

NTIDINESS—See Housekeeping, Dust, Constantinople.

PHOLSTERERS AND DECORATORS—Upholsterers' ›lies are of a hazardous character, i.e., hair, tow, moss, ›ses, cotton, shoddy and excelsior. Storage of these, :cially in loose form, is a serious feature. Ordinarily : a picker machine in the basement with untidy condi- s around same. Average shop is crowded and untidy, ı heating of glue, and supply of oils, paints and varnish *incidental hazards.* Heating and lighting apparatus

should be carefully looked after. The average decorator simply handles the stock, and cuts and sews the fabric decorations, coverings and hangings. Severe criticisms are often necessary regarding conditions in these shops. Fires usually occur in pickers or from working upholstering material too near open gas lights or fires. Sometimes retouching of furniture is included. This class is considered unfavorably by most companies.

UPHOLSTERERS' MOSS in bales is usually bound with wire. An ordinary fire will only scorch the outside of the bale. Water will cause the moss to swell and perhaps break the wire.

UPPER FLOOR CONTENTS—Those above the reach of fire departments should be written cautiously. Hose streams can hardly be expected to be effective above the sixth floor, consequently firemen usually rely on the standpipe system in the building for upper floor fires. See Stocks.

URANIUM—The great future for uranium apparently lies in its use as a steel hardening agent. Although there has been much prejudice against ferro-uranium, the results obtained by many tool manufacturers and users of high-speed steel show that it has real merit; and it is probably only a question of time when it will be just as largely used as ferrotungsten and ferromolybdenum.

USE AND OCCUPANCY INSURANCE is intended primarily to protect the assured against certain contingent losses which he may suffer should his place of business be damaged or destroyed by fire. Such contingent losses may include net profits, taxes, legal liability for royalties and salaries or wages, and other charges which may not be discontinued even though the plant is rendered unfit for operation by reason of fire.

Many Use and Occupancy forms have been devised, but a concerted effort is being made to secure uniformity; a form prepared by a committee of competent underwriters, which seems equitable to both the assured and the insurer, is quoted as typical of the best practices in Use and Occupancy insurance and the amount of use and occupancy insurance should *always be* based upon the annual use and occupancy value

en though the insurance is written for a time less than e year. The following is a standard form: **Straight Use d Occupancy;**

BUSINESS INTERRUPTION INDEMNITY
(Use and Occupancy Insurance)

.........On the use and occupancy of..................
situated...

The word "business" wherever used in this contract shall considered and held to have the following meaning accordg to the class of property insured:

(a) In a MANUFACTURING property: "The production goods."

(b) In a MERCANTILE property: "The sale of goods."

(c) In OTHER CLASSES of property: "The carrying on the business operations usual to the class."

The word "day," however modified, wherever used in is contract shall be held to cover a period of twenty-four 4) hours.

If the said building, or machinery or equipment or stock ntained therein be destroyed or damaged by fire occurring iring the life of this policy so as to necessitate a total or irtial suspension of business, this Company shall be liable ider this policy for the **actual loss sustained** of net profits i the business which is thereby prevented, and for such ked charges and expenses as must necessarily continue durg a total or partial suspension of business, for not exceedg such length of time as shall be required with the exercise f due diligence and dispatch to rebuild, repair or replace ich part of said building, and machinery and equipment and ock as may be destroyed or damaged (commencing with ie date of the fire and not limited by the date of expiration f this policy), under the following terms and conditions, -wit:

During the time of a **total suspension** of business, liability nder this policy shall not exceed $......... for each usiness day of such suspension.

During the time of a **partial suspension** of business, the er diem liability under this policy shall not exceed that *ortion of the per diem* liability which would have been

incurred by a total suspension which the decrease in production (or business) bears to the full daily production (or business) at the time of the fire.

It is a condition of this insurance that the daily production (or business) at the time of the fire shall be based upon the average daily production (or business) of all plants or properties herein described for the............days of full operation next preceding the fire.

Liability hereunder shall not exceed the amount of insurance by this policy nor a greater proportion of any loss than the insurance hereunder shall bear to all insurance, whether valid or not, covering in any manner the loss insured against by this policy.

It is a condition of this insurance that the assured shall not be entitled to compensation on account of delay which may be occasioned by any ordinance or law regulating construction or repair of buildings, or by the suspension, lapse or cancellation of any license, or for any other consequential damage.

It is a condition of this insurance if covering on replacement of stock in a manufacturing property,—

First, that no liability is assumed on account of damage to the finished product or for the time required to reproduce any finished product which may be damaged.

Second, that liability for curtailment of production due to damage to, or loss of, raw materials shall be limited to that period of time for which the damaged or destroyed raw materials would have furnished operating conditions for the plant. No liability shall exist on this account, unless or until actual curtailment of production shall have occurred through the assured's inability to procure suitable materials to take the place of those damaged or destroyed.

It is a condition of this insurance that as soon as practicable after any loss, the assured shall resume complete or partial operation of the property herein described and shall make use of other property, if obtainable, if by so doing the amount of loss hereunder will be reduced, and in the event of the assured continuing business (in whole or in part) at some other location or using other property during the

time occupied in repairing or reconstructing the property named herein, the net profits so earned shall be applied to the reduction of the loss and adjustment shall be made as provided herein for partial losses.

Surplus machinery or duplicate parts thereof, equipment or supplies, and (if this policy covers on stock) surplus or reserve stock, which may be owned, controlled or used by the assured shall, in the event of loss, be used in placing the property in condition for the resumption of business.

In case the assured and this Company are unable to agree as to any question affecting the amount of loss under this policy, the same shall be determined by appraisers in the manner provided by the policy to which this form is attached, the provisions of which policy shall govern in all matters pertaining to this insurance, except as herein otherwise provided. Other concurrent insurance permitted. Lightning and Electrical Exemption Clauses.

Lightning Clause:

Except as provided in the Electrical Exemption Clause below, this policy shall cover use and occupancy loss caused by lightning (meaning thereby the commonly accepted use of the term lightning, and in no case to include loss or damage by cyclone, tornado, or windstorm), not exceeding the sum insured, nor the interest of the insured in the property. Provided, however, if there shall be any other use and occupancy insurance on said property, this Company shall be liable only pro rata with such other insurance for any use and occupancy loss by lightning, whether such insurance be against loss by lightning or not.

Electrical Exemption Clause:

It is a special condition of this policy that this Company shall not be liable for any use and occupancy loss resulting from damage to dynamos, exciters, lamps, switches, motors and other electrical appliances or devices, caused by electrical currents whether artificial or natural, including lightning.

It will be observed that the form is non-valued as to the daily indemnity. In the past many valued forms have been written but their use should be discouraged. If we examine into the various factors which go to establish the value of the

Use and Occupancy of a plant, we must realize that it is impossible for Insurance Companies to determine in advance the amount of Use and Occupancy insurance which should be granted. The question is usually left to the assured and his insurance advisor, and where a valued form is used the daily indemnity may be placed by them at so high a figure as to enable the assured to derive a profit from a fire, instead of merely indemnifying him for his loss.

The daily indemnity should usually be limited to not exceeding 1-300th of the amount of insurance carried under the policy, and this limitation is fair to both the assured and the insurer, except in lines of business which are affected by seasonal trade, as for instance, jewelry stores and department stores which do their largest business in November and December, and summer hotels and theatres. In such cases it is reasonable that the indemnity during the active period should be placed at a higher figure than when trade is at a standstill or at its minimum. This is accomplished by having varying amounts of daily indemnity for each month mentioned in the policy. Underwriters should be careful, however, that under no circumstances should a fire cause a total loss under the policy conditions, unless the inoperative period is equal to a year or more.

Unless the proposed standard form is used, the following points should be considered when writing a form. It is desirable that the words "not exceeding" appear before the amount per day to be agreed upon so that the form will not be a valued one; also the clause "It is understood and agreed that if by reason of fire on the above mentioned premises the assured shall be prevented from transacting business."

The reason for the above is to cover only the property mentioned in the policy, as the assured may have a fire in another location which would in turn affect the use and occupancy insurance of the risk. Should the assured, while the building is untenantable as the result of fire, conduct business at another location the loss to the insurance company would be correspondingly less, because the profits made *by the assured* at the temporary quarters should be deducted

when final adjustment is made, and this feature should be incorporated in policy forms.

Forms reading "and this policy covers also for the further period of time required for adjustment of loss under this policy" should be avoided.

It is well to avoid risks that are not well established and managed, those manufacturing "fads" or catering to a temporary trade.

The following are some of the less desirable use and occupancy risks because in some cases the losses would be hard to adjust:

Summer resort hotels, concessions at summer parks, seasonable business, hotels located on roads which are becoming less popular with motorists or situated in localities which have lost their prestige are poor for use and occupancy insurance. In seasonable risks, some forms specify a larger amount for busy months and only a nominal amount for dull months.

In some cases the building and contents of a plant may not be desirable as a fire risk and yet may be a good use and occupancy risk; as for instance, a large one-story frame planing mill would not appeal to most underwriters as a fire risk on account of probably suffering a total loss and yet the use and occupancy might only suffer a 20 per cent loss. The building could be erected and all machinery, being modern and purchasable near the risk, be set up inside of two months. The following are examples of poor use and occupancy propositions: $200 a day on use and occupancy of a hotel having 150 rooms, with an agreed valuation of say $2 per room stipulated in the policy, decline unless the amount is $300 a day, i.e., 150 times $2.00 for each room. Another case of note was the recent fire in a lace paper factory in Brooklyn where a small fire put the boiler and engine room and a few of the imported dies out of commission, with the result that the manufacturing was stopped for about two months. The loss on the building and contents did not amount to over $1,000, while the use and occupancy loss amounted to eight times that figure.

When underwriting Use and Occupancy insurance careful consideration should be given to the following:

Construction, protection, occupancy, average daily output, idle periods, market favorable for steady operation, future outlook, special processes, process in duplicate, specially made or foreign machines and dyes, source of raw materials, power plant in duplicate. Would a small fire cripple the entire plant or could part of the work continue? The length of time it would take to replace any portion of the plant. Labor conditions also play a very important part.

The following would be a good Use and Occupancy proposition. A clock factory of good mill construction, modern machinery, raw materials being mainly brass goods, and easily obtainable; duplicate power system; boilers in fireproof section cutoff by approved fire doors. A line of $24,000 insurance offered would be divided by 300 working days which equals $80 per day. On account of the good construction and splendid arrangement of the factory with duplicate power plant, cut-off boiler room and raw materials easily obtainable, this plant would probably be in operation again inside of 30 days.

William H. Gartside of the National Fire in a recent address to the Examiners' Club of Chicago—"When we cover the use and occupancy of a manufacturing plant," said Mr. Gartside, "we are covering a more or less intangible something, the characteristics and features of which are not as plain to the underwriters as are the physical aspects of the risk. The value of a building, machinery and stock may be fairly judged from an inspection, but who can tell what the value of the plant is as a producer?

"Two plants with physical values approximately the same may vary widely from the standpoint of productivity or profit, and in a large degree it is necessary to rely on the owner's figures as to the use and occupancy value.

"That is one reason why some companies restrict their lines to well-established firms and individuals of good financial standing who have demonstrated their ability to conduct their business profitably."

Increases the Moral Hazard—He thinks that use and oc-

cupancy insurance is more apt to increase than decrease the moral hazard. It is human nature to lose the sense of responsibility as the penalty for failure to exercise that sense lessens, and the man who is so completely insured that he cannot lose by any fire is likely to be less vigilant than the man who will have a material loss regardless of the amount of insurance collected.

USNIC ACID—A yellow dye material.

V

V is the abbreviation for volt.

VACANCY—Vacant buildings should always be inspected to see if they are clean and in charge of a watchman. When located outside of protection, they are not considered attractive fire risks. A burglar hazard is present when no watchman is employed. Thieves remove lead pipe and fittings, brass, etc., and sometimes rig up a melting furnace by connecting to the gas supply pipe with a rubber tube. See Unoccupied Buildings.

VACANT—If a building (according to the fire policy) is vacant or unoccupied beyond a period of 10 days the insurance is vitiated unless agreement in writing is attached thereto. Vacant is construed to mean an empty building devoid of personal habitation.

VACANT LOTS (not enclosed) are not a serious menace to surrounding property if kept clean. Those enclosed or partly enclosed by fences are usually "hangouts" for boys and men who are apt to commit acts of depredation, such as building bonfires, etc. Where lots adjoin tenements, they are apt to become the depository of rubbish thrown by tenants. Fires communicate to cellars of risks through areaway windows or doors. See Wagons; also Rear Yards.

VACUUM OIL—See Hydrocarbon.

VALERENE—A very combustible hydrocarbon.

VALERIANIC ACID—A colorless, oily liquid, not inflammable.

VALLEY—The space between two inclined sides of a roof.

VALONIA NUTS are used in dyeing; they contain considerable tannin.

***VALUATION* OF BUILDINGS**—See Appraisals.

VALUE OF A LEASE INSURANCE—This class of insurance is generally written under the following forms:

Form No. 1:

On the assured's leasehold interest (term of lease, from the .... in the brick and stone building situate ....

It is mutually understood and agreed that for the purpose of this insurance the value of said leasehold interest on the date of issue of this policy is fixed at $...... and that said value and the insurance under this policy are automatically reduced $...... each month during the continuance of this policy.

It is further understood and agreed that if the above described building **shall be totally destroyed** by fire, this Company shall pay the whole amount of insurance in force under this policy on date of fire. If the building shall be damaged, **but not totally destroyed and the lease is cancelled this Company shall be liable for the percentage of the amount of insurance in force under this policy that the damage to the building caused by the fire shall bear to the 80% cash value of the building.** That if the above described building is damaged by fire and thereby rendered untenantable, but the lease is not cancelled, this Company shall pay at the rate of $...... per month to be computed from the date of fire to the date when, with due diligence, said building could again be rendered fit for occupancy. In no case shall this Company be liable for more than the amount of insurance under this policy nor for any loss other than that which may arise under said leasehold interest.

This form may not fully indemnify the assured for his loss of leasehold interest. Should his lease be terminated under its conditions, by reason of the building being damaged by fire, **but not totally destroyed,** the Company would only be liable for that proportion of the insurance in force that the damage to the building bears to 80% of its value. In other words, the percentage loss under the leasehold policy (form No. 1) would be the same as that under a building policy which is subject to an 80 per cent co-insurance clause.

Form No. 2:

On the assured's leasehold interest (term of lease) in the brick and stone building situate..............................

It is specially understood and agreed that if **the said building shall be totally destroyed by fire** this Company shall pay the whole amount hereby insured less a deduction of $............ per month for the time that shall have elapsed between the date of..................... and the date of occurrence of said fire; and in case of such damage by fire as shall, **without total destruction, render said building untenantable,** this company shall pay at the rate of not exceeding $............ per month to be computed from the date of such fire to the date at which by due diligence the said building could be repaired and rendered fit for occupancy; such time in case of disagreement to be determined by appraisement in the manner provided in the Conditions of the policy, but in no case shall this Company be liable for a greater amount than the sum insured, nor for any loss other than that which may arise under said leasehold interest.

The above (form No. 2) is only used in those cases where the lease especially states that **total destruction terminates the lease.** See Leasehold Insurance.

VALUED POLICY—A contract where no co-insurance is required and the company accepts the amount of insurance as the value of the property. Horses, paintings and some of the special forms such as use and occupancy, profits, etc., are usually written under a valued form. See Profits; see Use and Occupancy.

VALUES—One of the important features to be ascertained before the underwriter assumes liability on a risk. What may appear to be "gilt edge" according to the broker or the rate card in the cabinet may be a very poor proposition after inspection; for example, ⅞ths of the value may be in the sub-basement or possibly on the sixth floor of an unsprinklered building.

VALUES OF BUILDINGS—When prices of building materials rise and thereby increase the cost of replacing same in case of fire, the values of buildings increase and the insurance should be increased proportionately to maintain the ratio to co-insurance. See Depreciation; see Salvage.

VALVES—Various devices for permitting or stopping at pleasure the flow of water, steam, gas, etc.

Valve, O. S. & Y. (meaning outside screw and yoke)—The approved gate valve for sprinkler equipments. The distance the stem projects indicates at a glance the exact distance it is open. See Sprinklers; see Gate Valve.

Valves (control)—On a sprinkler equipment should be kept open with a leather strap, with ends sealed so that the valve cannot be closed without breaking the seal. They are placed on feed lines on each floor or each section of a risk, so that water can be shut off from small areas in case of accident.

VALVOLINE—An earthy oil used for lubricating purposes. Not subject to spontaneous combustion.

VANADIUM STEEL is steel that has been treated with vanadium—a semi-rare mineral, which rids the molten steel of its impurities, bringing the molecules closer together, giving them greater adhesiveness and making the resultant product infinitely tougher and stronger.

VANDYKE BROWNS—See Chromes.

VANNERS are endless rubber belts on rollers mounted on an incline frame, the belt traveling up and around the lower drum which dips into water where a mineral is deposited. Ore is fed to the belt in a stream of water which flows down the incline.

VAPOR DAMAGE—In storage warehouses susceptible stocks like tobacco, coffee, flour, etc., are often seriously affected by the presence of strong vapors or scents from sulphur, essential oils, and chemicals.

VAPOR-PROOF GLOBES—See Arc Lamps.

VAPORS—The vapors of numerous liquids are the cause of many serious fires especially where open lights or flames are in close proximity. See Illuminating Gas; see Japanning, Varnishing and Painting.

VARIABLE PRESSURE ALARM VALVE (working of)—When the water flows just slightly, the check valve partly rises and some of the water flows through a small pipe connected to a long receptable known as a "niggerhead" chamber. If this is only a temporary flow, the water will only go about one-half or one-quarter way up this chamber and will

find its way out of the chamber by means of a disc valve; but should the check valve completely open (as in case of fire) the water will immediately fill the chamber and travel up to the "niggerhead" at top and bend the diaphragm, causing an electrical circuit, thereby sending in an alarm to headquarters or allowing water to ring the water motor alarm and at the same time the diaphragm will close the drip valve. See Sprinkler Equipment; also Alarm.

VARIETY STORES—This miscellaneous stock is very susceptible, and considerable packing material is used. Financial standing of firms is very important, as they cannot buy to advantage in the open market in competition with large firms. See Five and Ten-Cent Stores.

VARNISH is composed of several essential ingredients: Gum to give hardness and lustre, oil to impart elasticity, a solvent or thinner to keep it in a liquid state and dryer usually composed of lead and manganese. It is invariably added to the oil before the varnish is made and varies according to the kind necessary to produce required results. Fossil gums are used for the best varnishes; and are the hardened sap of trees that lived thousands of years ago. The gum known as kauri is the chief and most widely used. The oils for varnish are made chiefly of linseed and china oils, specially prepared and well aged. The solvent is chiefly turpentine.

VARNISH FACTORIES—The varnish-maker first melts the gum over a coke fire in a copper kettle. When the gum is properly melted, the oil, which is hot having been separately heated, is added. After adding the oil, the gum and oil are heated together until the two are uniformly combined, when the kettle is withdrawn from the fire. The kettle is next taken to the thinning room where the mixture is allowed to cool to a certain temperature and the thinner (benzine or turpentine) or solvent added (called reducing). After thinning, the varnish is pumped through a pipe to a vat or cooler where, in addition to cooling, it settles and becomes clearer. From the cooler the varnish is passed through a filter press, which removes all the dirt and foreign *matter.* The varnish is next pumped to the ageing tanks

where it is allowed to thoroughly ripen. This ageing makes the varnish bright and clear. Filter cloths are cleaned with caustic soda or benzine. Filter cloths in piles, unless clean, might ignite spontaneously.

Some varnishes have a flash point below 80 deg. F.

Spirit Varnish is made by dissolving resin in methyllated spirit or other volatile solvent.

If a fire occurs in the boiling house, the doors opposite the fires should be opened. This will create a draft, which will suck the flames up the brick stacks and prevent the fire spreading to the balance of the plant. If the thinning and boiling buildings are detached, without communication, the class is a fair one. Boiling and thinning buildings seldom included under the schedule of insurance on account of the high rate. Quick burners. (Pratt and Lambert.)

VARNISH AND PAINT REMOVERS usually consist of a wax dissolved in benzol and gelatinized by an alcoholic or ketonic body. Flash point is the same as gasoline, but on account of the wax used (to prevent evaporation) the flash point is not considered as dangerous, except when in use by workmen.

VARNISHING—A very hazardous feature (if extensive) connected with many manufacturing processes. This work should be done in a separate or cut-off section of a risk. Extreme care should be exercised to see that no open flame is near, as this vapor has been known to travel to an open flame 150 feet distant. (W. P. Walsh.)

VARNOLENE—A benzine substitute approved by Underwriters.

VASELINE—A mixture of iso-paraffine with lower hydro-carbides obtained from a petroleum still.

VAULT—A compartment of brick, concrete or similar material used for storage of records, paints, etc. See Bank Vaults.

VAULT LIGHTS—Usually small, heavy bull's-eye glass in heavy iron frames.

VAULTS FOR FILMS—See Motion Pictures.

VAULTS FOR SHAVINGS or other refuse should be of fireproof construction and located outside of main building

with communicating openings as small as possible. Doors to same should be standard, tight-fitting and automatically arranged. See Shaving Vault; also Direct Feed.

VEGETABLE ALBUMIN, if wet will form a jelly like the white of an egg. Unless it is immediately dried it will be a total loss. Used chiefly in medicine.

VEGETABLE BRIMSTONE—A very fine and extremely combustible powder. See Lycopodium.

VEGETABLE FIBRES are more subject to spontaneous ignition than are animal fibres. They burn readily and briskly and once lighted are apt to continue burning. A combination of vegetable and animal fibres causes the combination to become as susceptible to spontaneous ignition as though it were all vegetable fibre.

VEGETABLE IVORY is made from Tanqua nuts and is used mainly for making buttons.

VEGETABLE OIL (storage of) on solid ground and on open dock or warehouse over water—The storage of Vegetable Oil on land has presented to the underwriting fraternity of the Pacific Northwest some very interesting and perplexing problems in the past few years,—one being to provide protection to the importers on a commodity that was, in a way, a new venture, the average underwriter not knowing much of the hazards to be guarded against, also how to provide an efficient means of controlling a fire should one start,—for it was well known in combating an oil fire,—water, the main agency for the extinguishing of fires, has to be applied in an intelligent way or else it would tend to spread instead of extinguish same. The average department is not provided with chemicals in sufficient quantity to combat a fire of large area. When it was determined by an analysis that the flashing point was 564 deg. F., one was possibly misled into believing that the oil would not burn until heated to that degree; it is not of a combustible nature and not subject to spontaneous combustion unless mixed with some foreign matter. However, the recent fire at the Smith Cove Terminal in Seattle has taught us some very good lessons and the oil is now handled and stored in a much more intelligent manner. The large storages here

'roper method of stacking boxes containing canned oil. Note wide gangway.

now are a far better risk from an insurance standpoint than ever before as the storage yards are protected by sand dikes and concrete retaining walls.

When a ship with a cargo of oil arrives in port, the oil is unloaded from the boat to the dock by means of slings. It is then placed on hand trucks, passed over the weigher's scales and into either storage yard or on to dumping tables. The oil is stored in either open yard, dock or warehouse in its original cases or is bulked for tank storage. In the open yard or dock storage cases are placed on an average of 9 high in large blocks, with trucking aisles between, the yard having first been covered with heavy boards. All leaky cans are emptied when they are unloaded from ships and the yards present a tidy, clean appearance. Through the aisles are placed barrels of sand with long handle scoops to each barrel, the aisles being arranged so as to be accessible to lines of fire hose. There is also an approved system of water protection installed, together with a much improved watchman service both day and night. The housekeeping which was at first very poor, and the cause of much uneasiness on the part of the underwriter, has been very materially improved, in fact shows almost as much if not more improvement than any other one feature. The values in the large storage yards are now separated by clear space varying from 100 to 150 feet and the congestion which was such a handicap at first is now being overcome in this way.

At a yard in Seattle last fall there was at one time practically $25,000,000 of oil subject to a sweeping fire and owing to the limited amounts that any one company would accept on the oil the assureds were able to secure only partial coverage. Fortunately Providence favored and there were no fires.

Another and more perplexing problem confronting the insurance fraternity is to provide means of protection for oils stored on open wharves over water, in that they are confronted with the hazard of burning oil floating on water underneath the pier or dock should it once get to burning sufficiently. In that event the burning oil would not only aid in further destruction of the dock in question but would

Vegetable oil tanks. Note concrete dikes around tanks

be liable to communicate the fire to adjoining property and create a very serious and perplexing condition. The fire at Smith Cove in Seattle last fall clearly demonstrated that this hazard existed to a very alarming degree. It seems to be the prevailing opinion of men in position to know, that the fire at Smith Cove Waterway would have resulted much more seriously had not the tide and wind been all in favor of the fire fighters.

There are now oil storages at all of the principal ports of entry on Puget Sound where conditions exist that are in a way liable to produce a similar condition to that above referred to if a fire of any intensity should occur. These conditions, in the writer's opinion, are a very serious menace to the surrounding water front property with practically no precaution having been taken to prevent burning oil from flowing into the waters underneath the storage dock or warehouse. (W. P. Cassell.)

Vegetable Oil—Another name for resin oil.

VEGETABLE OILS (also known as seed oils) are extracted by hydraulic pressure after cooking, or by what is known as the bisulphide of carbon or mineral naphtha process. In the latter process naphtha is put in a steam-heated receptacle with the material which has been previously crushed. This digester is sealed up, allowed to remain for a while, the liquid is drawn off and the naphtha vapor passed out through a condenser. Electric lights and steam heat should be used because in case of accident the naphtha vapors may escape into the room and be ignited if any open flame is present. Vegetable oils are more hazardous than mineral oils as they have an affinity for oxygen and dry quicker by the absorption of the oxygen. Animal oil, unless rancid, is not apt to cause spontaneous combustion, but all oil-soaked substances should be treated as hazardous. See Mineral Oil.

VEGETABLE WAXES such as those extracted from candelila plant are being widely used. Candelila wax is used in making candles, phonograph records, wood and leather polishes, floor wax, varnish, linoleum, rubber compounds and celluloid; also for electrical insulating compounds.

Vegetable oil being unloaded and stored above wharf.

VELLUM is parchment made of suckling calves' hides.

VELOCITY—The rate of motion or the degree of quickness with which an object moves.

VELOCITY OF EXPLOSION—The heat and gas evolved are the two principal factors which govern the power of an explosive, i. e., the amount of work it can do in the way of displacing objects. But the time taken by the explosion is also a matter of great importance. The rate of explosion is measured by making a column of the explosive, confining it if necessary in a metal tube, and measuring the time that the explosive wave takes to travel a known distance. In black powder and similar nitrate mixtures the velocity of explosion is only a few hundred metres a second but with modern high explosives the velocity of detonation is from two to seven thousand metres a second. This naturally makes them much more violent and destructive. Explosives of the gunpowder type are used when earth or soft rock is to be blasted or when the material must not be broken up too much. (A. Marshall.) See Explosion and Explosives.

VELVET BEANS—A product of Florida, used as a forage crop and for fertilizer. A growing industry is that of converting the beans into meal. They are dried and ground in machines similar to a disc cottonseed huller, and also in a velvet bean "beater." The former cracks the pods and the latter cuts them up. The meal is collected in hoppers, sacked and shipped. The machines used should have magnets to catch metallic substances. The beans do not burn readily and are only remotely subject to spontaneous combustion, whether whole or ground.

VELVETEENS are easily damaged by water.

VENEER is made by sawing lumber into thin slices, or by turning off the veneer from short lengths of logs which have been previously soaked or steamed in vats. The lathes used in the latter process are of heavy type with automatic features for turning the log slowly and at the same time advancing the cutting blade against the log. Other processes may include gluing and pressing the veneer upon a backing, drying, filling and varnishing. The hazards are those of *woodworking*. Stock is susceptible to fire and water dam-

age, as the elements will destroy or cause the veneer to warp. Fierce burning risks. Not as good as ordinary woodworkers. See Shaving Vaults.

VENICE TURPENTINE—A heavy liquid resembling varnish. Its base is rosin. It is used in the manufacture of printers' inks and shoe polishing paste, and also as a low grade varnish. Burns with a heavy black smoke. The makers claim the flash point is high.

VENTILATING SHAFTS—Should be enclosed in a standard manner, and have thin glass skylights. Those opening to toilets should have standard louvres. Fires generally find their way up these shafts. See Pipe Shafts; see illustration on page 726.

VENTURES—See New Ventures.

VERANDAS—Enclosed porches if continuous along rows of buildings, act as communications, and are likely to spread fires.

VERDIGRIS, or BASIC ACETATE OF COPPER is prepared by piling up sheets of copper with layers of fermenting husks of grapes (the marc of the wine-press), when the oxide of copper, formed at the expense of the oxygen of the air, combines with the acetic acid furnished by the oxidation of the alcohol.

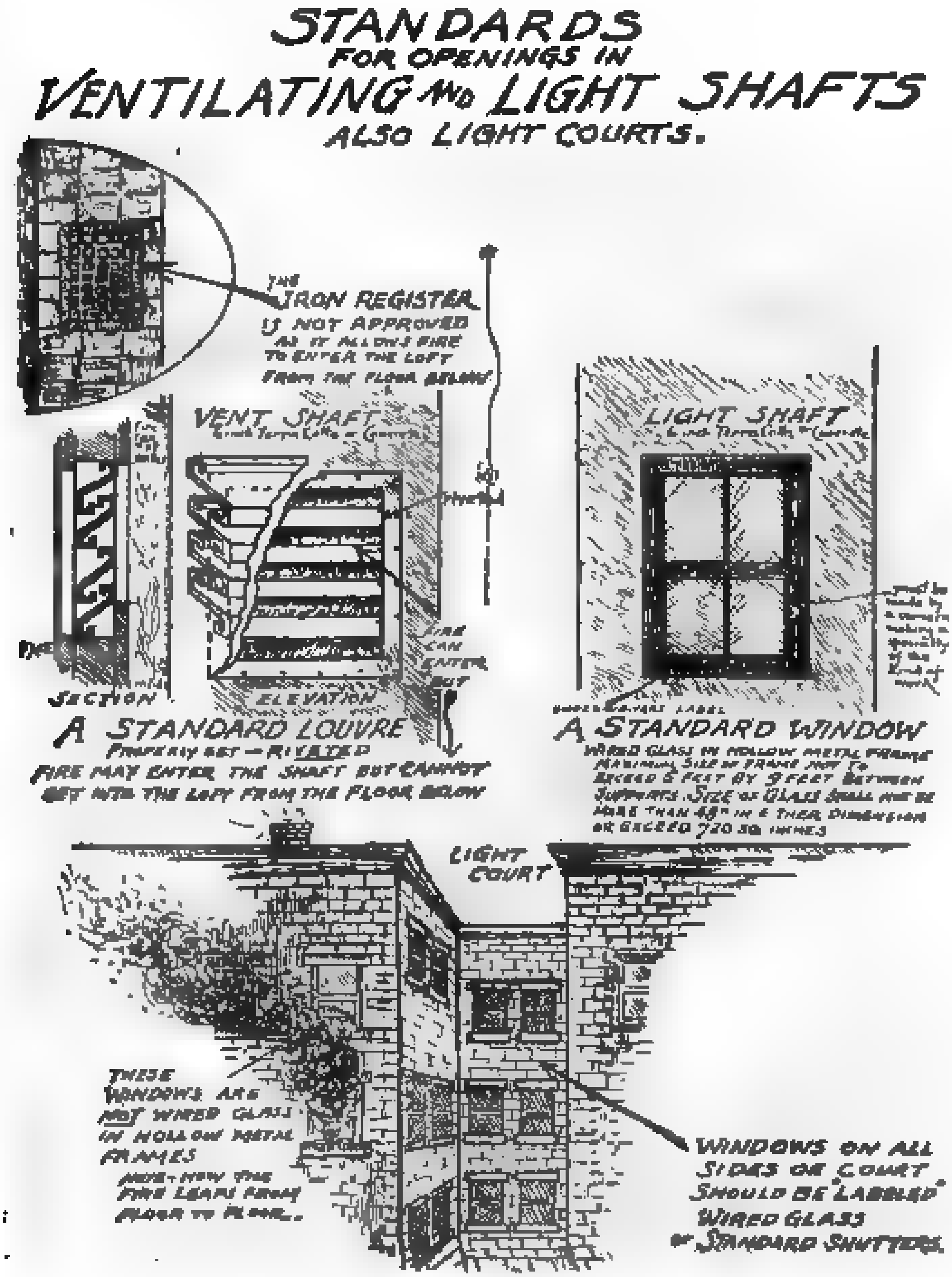
VERMICELLI—See Macaroni Mfg.

VERMILION—A red pigment consisting of powdered cinnabar, or red sulphate of mercury.

VERMIN DESTROYER—This particular destroyer is fly paper, which consists of a heavy paper coated with rosin and linseed oil. The linseed oil is boiled in an open vessel after which rosin is added. The paper is then coated from small kettles set on the tables kept warm by gas burners. Heating of oil and rosin is often done by direct fire heat which is dangerous. Grease is sometimes also used. A poor class to insure.

VESSELS—On steam vessels most of the fires are caused by stacks piercing poorly protected wooden decks, spontaneous combustion in coal bunkers, upsetting oil lamps, stoves or candles, hot ashes on poorly protected floors of boiler rooms, oily waste in engine rooms, upsetting pans of grease

on stoves, carelessness in use of torches in hands of stevedores or other workmen and chemicals in cargo. Electric wires, stoves, lamps and boilers should be installed under standard rules similar to those enforced on land.



VIBRATION OF BUILDINGS—Buildings, large or small, vibrate like a tuning fork whenever a heavy train passes by or a storm beats against the structure. Accidents from vibration are rare as it is well understood and guarded against. The most violent are felt in the low buildings rather than the high ones, and, as a rule, those of solid construction with masonry walls and foundations. The pulsations are registered and recorded on a delicate instrument such as records earthquakes, a movement of 1-100 of an inch being noticeable.

VIGORITE—A powerful explosive composed of nitroglycerine and chlorate of potash.

VINEGAR (cider, apple, wine or grape)—The product made from the juice of apples by alcoholic fermentation and subsequent oxidation to an andehyde and acetic acid. Imitation vinegar consists of a diluted solution of acetic acid.

VINEGAR AND YEAST WORKS—They are usually combined processes. Yeast is made from grain, beet pulp, malt sprouts, corn sugar, beet meal and similar ingredients. They are milled, mashed, cooked, fermented, germinated, filtered, dried and pressed into cakes. Vinegar is fermented from spirits and beech shavings and such other ingredients as the manufacture may add. Hazards are in some respects similar to breweries, including malt milling. Twenty per cent proof spirits are usually distilled from grain for use in the process. Incidental hazards are barrel painting and recoopering. The alcohol stills require good ventilation to the outer air. Fair insurance risks.

VIRITE—Composed of nitroglycerine, nitrate of potash and charcoal.

VISCOL is used in shoe factories as a rubber substitute, being a waterproof compound for dressing leather. It is thinned with petroleum oil or benzine, and in liquid form it is classed as a benzine hazard. Dipping should be done in a detached building.

VISCOLOID—A trade name for a nitrocellulose compound.

VISCOM—A composition for giving body to cheap oils. It possesses a high fire point.

VITRIOL—See Sulphuric Acid.

VOLATILE ESSENTIAL OILS—Are oils of turpentine, camphor and the like. See Essential Oils.

VOLATILE OILS—If in doubt as to whether an oil is volatile or not, place a small amount on the finger or hand. If it dries very quickly, consider it volatile. See Benzine or Gasoline.

VOLATILE SOLVENTS are ether, carbon bisulphide, gasoline, acetone, benzol, flavoring or fruit ethers, ethyl chloride, naphtha and benzine.

The hazard depends largely on the flash point or temperature at which the volatile solvents begin to give off inflammable vapors. All the above named are **highly inflammable** and evolve inflammable vapors at temperatures from below freezing point up to 80 deg. F.

The less hazardous solvents, amyl alcohol, fusel oil, wood alcohol, grain alcohol, amyl acetate, turpentine and kerosene, are all **inflammable,** and some of them have low flash points and are capable of generating inflammable vapors at temperatures of from 60 to 120 deg. F.—W. D. Grier.

VOLATILITY—A property of bodies by which they are disposed to assume the state of vapor and dissipate on the application of heat, whether natural or artificial.

VOLGALENE—A Russian petroleum lubricating oil.

VOLT—The electrical unit of pressure. Abbreviation is V. See Amperes; also Electrical Terms.

VOMITORIES are short, intermediate exit passages connecting to the larger or main exitway. They are used in theatres between the main aisles of balconies to facilitate exit and for convenience.

VULCANITE—See Ebonite.

VULCANIZERS—The same rule applies as to the setting of gas stoves. Gas heat is penalized, no matter how safely arranged, because gas heat at an appliance where rubber cement is used is extremely dangerous. Steam heat is approved.

VULCANIZING—Cementing two or more pieces of rubber together to form a compact mass. High temperature steam or gas-heated machines of various designs are used. *Always a hazardous feature if direct fire heat is used.*

VULCAN OIL—A petroleum distillate.

VULCAN POWDER is composed of nitroglycerine and nitrate of potash.

VULCARESTON—A new material similar to asbestos and India rubber.

W

WADDING (cotton)—Same as cotton batting. If loose, the hazard is the same as cotton. In bales, wrapped in burlap, it is considered fair insurance.

WAFERS AND CONES (ice cream cones)—The hazards are gas-heated bakers, mixers and automatic wafer and cone-baking machines. The cones are made up in winter for summer trade. The largest stock is on hand in March. The busiest season, January to March, but the plants start active production in October. The machines are of several types, flat-rotating, pan-revolving (operated by hand) sheet wafer, and large automatic cone bakers. The gas heat is directed on the moulds from inside burners. The dough is poured on the moulds, and baked in one revolution of the baker. An operator at each machine scrapes off the charred baked dough from the edges of the wafer or cone and the charred parts fall to the floor. In low setting bakers, the scraps accumulate under the baker and are frequently blazing piles. All baking machines should set on at least six inches of concrete. Baffle plates under machines, although advocated by most rating bureaus, tend to bank up the burning scraps and should be omitted. Over the large bakers there should be a ventilated metal hood, the same as over a range, to carry the heated air to the outside. Paper box making, machine shop for repairs, printing and pasting labels are incidental hazards. Generally occupy a floor in an old "omnibus" tenant factory and employ a cheap grade of help. This class has a bad fire record.

WAFERS (cocoanut)—Hazards are similar to ordinary bakery. Glucose and cocoanut are heated in a kettle, cooled on a marble slab and toasted in gas or coal-heated ovens. *Note the kind* of heat used for kettles and ovens. Fair in-*surance risks.*

WAGGON—A sharpened wooden instrument used for cutting gold leaf.

WAGON AND CARRIAGE SHOPS—See Wheelwright.

WAGONS in open yards are considered good insurance if the yard is fenced in, and the neighborhood is free from rowdies. Open trucks are preferable to closed wagons because they offer no concealment to trespassers. See Vacant Lots.

WAINSCOT—A wood facing to walls in rooms, extending upward from floor.

WAIST MANUFACTURING—Includes making cotton, silk or other fabric into waists or blouses. Hazards are cutting piece goods, sewing, pressing, cleaning spots with benzine or ether. The shops are cleaner and the fire record slightly better than the clothing factories.

WAIVER—Relinquishment of a legal right or privilege. Waiver clauses should be carefully watched by underwriters as some brokers try to manipulate the wording, and thereby give to the assureds more rights than they would ordinarily be entitled to.

WAIVER OF INDEMNITY—See Five Per Cent Waiver Clause.

WALLS—Several important considerations enter into the construction of walls. The first is the nature of occupancy of the structure, bearing in mind that at some future time the occupancy may radically change. The wall must be sufficiently thick to safely carry a maximum live or dead load, to stand upright, to resist wind pressure and vibration, and form a solid fire wall especially where there is an adjoining building. See Fire Wall.

Walls—For the warehouse class of buildings should be common brick as follows: Twelve inches if not over 40 feet high. If over 40 feet high require 16 inches for first 40 feet, and 12 inches above up to a height of not exceeding 60 feet. If over 60 feet, 20 inches for 25 feet and 16 inches the balance up to 75 feet. If over 75 feet, 24 inches for 40 feet, then 20 inches for 35 feet, and 16 inches the balance up to 100 feet. If over 100 feet, 28 inches for 40 feet, then 24 *inches for 35 feet,* then 20 inches for 25 feet and 16 inches

balance up to 125 feet. If over 125 feet, 32 inches for 30 feet, then 24 inches for 35 feet, then 20 inches for 35 feet and balance 16 inches to 150 feet high. See Bearing Wall.

WALL CHIMNEY—A chimney built into and forming part of a wall. See Bracket Chimney; also Corbel.

WALL COVERINGS—Some are made of oxidized linseed oil, Swedish clay, wood flour, chrome and earth colors, paraffine, lithopone, or similar materials. Mixed dry, passed through calender, spread over and pasted to paper backing. Surface is polished with linseed oil and turpentine. A poor fire record class.

WALL-HYDRANT or fire plug is one set against or close to a wall, connected with a supply pipe through or under the wall.

WALL PAPER DEALERS AND HANGERS—Busiest months, July to October. Unless stock is turned over annually, there is apt to be considerable shop-worn stock, and out-of-date patterns on hand. Wall paper stocks are very susceptible. Obsolete stock on hand is a serious feature from a moral hazard standpoint. Retail stock not as desirable as a wholesale stock.

WALL PAPER FACTORIES—Finishing Process—Paper is varnished in "varnishing and printing" machine by passing the paper over a rubber-covered drum, then coated with benzine or turpentine-thinned varnish, which deposits a thin coat of varnish on the paper. By means of a traveling belt the paper then passes over steam pipes to dry, and is carried in festoons a long distance across the room, thus it is thoroughly dried before being removed at far end. A ventilator with a suction fan is located over the steam pipes, which sucks the benzine or turpentine vapors to the outer air. Static electricity is often produced in this process if paper is passed too close to the metal ventilator. The hazards consist of color-mixing, using clay, glue, lard and oil; drying and embossing. Inspectors should note color room, glue heaters, machine shop, sample book making, care of *waste and* storage of oils. Fires in this class are usually *very severe*. One risk in New York City has burned five

times, several of the fires starting in the color room. Generally avoided by underwriters.

WALL PLATE—Timber laid along the tops of walls for the roof trusses or rafters to rest upon so as to distribute their weight more equally upon the wall. See Template.

WALL SIZING—Consists of caustic soda, soda ash, tapioca flour, cornstarch, dextrine, neutral salts, gum arabic and dry soap powder. Grinding, mixing, sifting and packing are the important hazards. The manufacture of sizing has a poor fire record.

WALNUTS—See Nuts.

"WAR CONDITIONS"—During the late war the causes for the high loss record were classified as due to—

(a) Malice, to inflict damage from hostile motives or to cripple war supplies. This was a very serious factor, affecting particularly grain depots, waterfront properties, lumber, tobacco, factory and warehouse risks.

(b) Fires occasioned by the high pressure under which the work of production and distribution was rushed and which was the direct cause of large factory and pier fires, including many sprinklered risks of large values. With this should be included the menace of employment of masses of untrained, inefficient help on technical processes.

(c) Fires and explosions resulting as an inevitable consequence of the handling of vast quantities of explosive and inflammable materials, of which the Kingsland, N. J., and the Halifax explosions and conflagrations were typical instances. See Guards.

WAR RISK INSURANCE affords protection against all of the hazards caused by war, invasion, insurrection, riot, civil war and civil commotion, including strikes, military or usurped power, bombardment and explosion.

WAREHOUSE, PRIVATE—One where the contents are owned by an individual or a corporation who agrees to certain specifications laid down by local rating bureaus. Good fire risks.

WAREHOUSES—A bonded warehouse is one where the goods are stored under government bond or control and *from which goods* cannot be removed until certain govern-

ment requirements have been complied with. Excellent fire risks. See Storage Warehouses. See Alphabetical List; see Fibre Warehouses; also Wharf Clause.

Listed Storage Stores are divided into two classes: **fibre** and **non-fibre,** a distinction made to denote those which store cotton and other vegetable fibres, and those which do not In turn, **non-fibre warehouses** are divided into stipulated and non-stipulated and chemical warehouses.

Stipulated Warehouses will not accept certain merchandise and chemicals. For instance, ammonia, benzine, chlorates, etc., must be stored in a non-stipulated store. Good insurance risks.

Non-stipulated Warehouses will accept, in addition to what is allowed to be stored in a listed store, such chemicals and merchandise which are not allowed in a stipulated warehouse. Warehousemen sign an agreement stipulating that they will not store any fibre (in case of non-fibre warehouse) and to exclude from their premises explosives and all drugs of a poisonous or nauseous character. Non-stipulated warehouses may store any class of goods except fibre. See Chemical Warehouses.

Excellent Insurance in Warehouses—Aluminum (metal), anchors, antimonial lead, antimony metal, anvils, asbestos bricks, chains, chain cables, steel bottles (containing compressed air), copper, brass, bolts, rivets, nails, rods, tubing, copper ore, copper in pigs, ingots, brass sheets, crude rubber, gutta percha (crude), horse shoes, iron in bars, rods, castings, chains, railroad spikes, railway fences, iron tubes, pipes; metals in pigs, billets, blocks, bars, ingots, cakes, slabs and plates. Underwriters usually carry double or triple their regular authorizations on the above classes.

WAREHOUSEMEN'S ERROR AND OMISSION INSURANCE—See Error and Omission.

WARP in weaving is the threads which are extended lengthwise in the loom and crossed by the woof.

WASHING POWDERS usually contain soap power, soda ash and fine sand.

WASH-TUBS—Usually made from soapstone, called Al-

berene (taken from the name of the town from which the stone is quarried).

WASTE (cotton) if clean, is not subject to spontaneous combustion. See Oily Waste.

WASTE CANS (for oily waste or rags) are made of metal well riveted, with legs or rims, keeping bottom off the floor, and the cover with a short spring or bar to keep the lid off center so as to keep the can normally closed. For rubbish or ashes, provide a metal can with cover, and a metal rim at bottom, so as to keep the base off the floor. See illustration, page 614.

WASTE-PAPER STOCKS are prolific fire breeders. Serious menace to surrounding buildings. A. K. O. class with most insurance companies.

WATCHMAN—The best service can only be obtained when the watchman is employed for one purpose—that of watching, not when he has to do cleaning nor when he and his family live on the premises, as, in the latter case, more often than not he will be found in his apartment instead of patrolling the building.—Walter H. Holl.

WATCHMAN AND CLOCK—Rounds are made hourly nights from 6 P. M. to 6 A. M. and during the day on Sundays, holidays, and all idle periods. The clock must be approved by the underwriters. Central station supervision preferred. Clocks with one station only not desirable because watchman can manipulate same while sitting at one point instead of making his hourly rounds of premises.

WATCH OIL—Obtained from the dolphin, walrus, blackfish, snuffer, or shark.

WATER—The total amount of water used in large fires is not as great as frequently thought. A fire, for example, requiring ten streams for five hours would use 750,000 gallons. However, the rate of draft for fire fighting is frequently high in comparison with the ordinary consumption. Three standard fire streams discharging 750 gallons per minute, use water at a rate of a little more than a million gallons a day, and ten streams means a rate of flow of about three and one-half million gallons per twenty-four hours. Pipe sizes must, of course, be proportioned for the maximum

rate of demand which any fire is likely to cause. (French.) See Tables.

Water—Water is generally considered the principal agent for extinguishing fires. However, by virtue of its own chemical nature, when in contact with certain classes of sub-

stances, it may add to the intensity of the heat or the flame. On account of this property of water it is important to know the classes of chemicals that react with it.

Water as a chemical substance should be considered according to the following groups:

A—As a solvent where heat is generated.

B—As combining with another chemical, thus giving rise to a new substance entirely different than either of the original substances and which is inflammable.

C—As being made up of two gases, oxygen and hydrogen, into which it may be decomposed by metals and other chemicals. The hydrogen is inflammable and burns readily. Oxygen increases the intensity of the flame and also accelerates combustion.

D—As producing explosions when in contact with certain chemicals.

Group A

1—Chloride of zinc when in fused state dissolves with an appreciable amount of heat.

2—Sulphuric acid dissolves in water with a very large amount of heat.

3—Caustic soda, chemically known as sodium hydroxide, a white solid material, dissolves in water with much heat.

4—Caustic potash, chemically known as potassium hydroxide, a white solid, dissolves in water with a great amount of heat.

5—Bartya powder becomes incandescent.

6—Potassium hydroxide—see Caustic Potash.

7—Sodium hydroxide—see Caustic Soda.

8—Stannic chloride, when mixed with water, generates intense heat.

Group B

1—Calcium carbide, a grayish white solid, reacts readily with water, forming acetylene gas, which is inflammable.

2—Peroxide of sodium reacts with water and gives off oxygen and forms caustic soda.

3—Quicklime or calcium oxide dissolves readily in water, forming hydroxide of calcium, and a great amount of heat is evolved. No inflammable substance is formed.

4—Sulphur monochloride, a yellowish red liquid, used in preparing vulcanized rubber. It dissolves readily, giving hydrochloric acid, sulphur dioxide and free sulphur.

5—Sodium hydride, small needle-like crystals, react with water, giving hydroxide of sodium and hydrogen gas.

6—Potassium hydride, small needle-like crystals, react with water, giving hydroxide of potash and hydrogen gas.

7—Zinc methyl reacts readily with water, giving rise to hydroxide of zinc and a combustible hydrocarbon gas. Used largely in synthesis of organic substances.

8—Zinc ethyl reacts readily with water, giving rise to hydroxide of zinc and a combustible hydrocarbon gas. Used largely in synthesis of organic substances.

9—Acetyl chloride, a fuming liquid, whose vapors strongly attack the eyes and respiratory organs, reacts violently with water to form hydrochloric and acetic acids. This substance is very widely used in organic research laboratories.

10—Calcium phosphide reacts, producing calcium hydroxide and phosphene.

11—Chloride of sulphur, same as sulphur monochloride.

12—Nitrogen trichloride, an oily liquid of an *extremely* explosive nature. Decomposes with liberation of much heat.

13—Phosphorus trifluoride, phosphorus trichloride, phosphorus tribromide, phosphorus pentafluoride, phosphorus pentachloride, phosphorus pentabromide all decompose with water, giving an oxygen acid and phosphorus and the corresponding hydrogen halide.

14—Silicon tetrachloride generates intense heat when mixed with cold water, forming silicon and hydrochloric acid.

15—Chloride of silicon, same as silicon tetrachloride.

16—Silicon tetrafluoride generates intense heat when mixed with cold water, forming silicic and hydrofluoric acids.

17—Fluoride of silicon, same as silicon tetrafluoride.

18—Nitrogen peroxide, in contact with water, is decomposed into nitric oxide and nitric acid.

19—Nitric peroxide, same as nitrogen peroxide.

20—Sodamide decomposes water with explosive violence, *releasing* hydrogen gas.

21—Titanium chloride decomposes water, evolving hydrogen gas.

Group C

1—Lithium, sodium, potassium, rubidium, and cæsium react with water at ordinary temperatures to form hydroxide of the metals and hydrogen gas.

2—Slightly heavier metals of calcium, strontium and barium react with water more slowly than the lighter metals to form hydroxide of the metals and hydrogen gas.

3—Magnesium reacts with water slightly at 30 degrees and strongly at 100 deg. C. to form hydroxide and hydrogen gas.

4—Cadmium reacts only slightly.

5—Titanium at 100 deg. C reacts rapidly.

6—Uranium decomposes water very slowly.

7—Zinc, aluminum, manganese when finely powdered, react with water much more rapidly than in the solid form. Metals of iron, cobalt, bismuth react when glowing hot to form oxyhydrogen gas. Non-metal carbon is also in this class. Copper and nickel, when glowing hot, do not react greatly with water. Various bronzes, due to the fineness of the metals which constitute them, react very rapidly with water, often at ordinary temperature, to form hydroxide and hydrogen gas.

8—Gallium (when combined with aluminum) acts similar to sodium.

9—Fluorine displaces the oxygen in water and forms hydrofluoric acid and ozone.

Group D

1—Hydrazoic acid in pure state explodes violently in contact with water.

2—Nitrogen hydride extremely dangerous. It will not stand concussion or heat. This danger may be lessened by dissolving it with water, but the solution must be very dilute, otherwise it will burn on contact with flame.

3—Azoimide, same as nitrogen hydride.

Water as a Non-Extinguisher—The following substances cannot be extinguished with water, as water will not mix with them, and acts as a carrier of oxygen: Oils, fats, varnish, resins, mineral oils, tar, benzol, carbon disulphide,

ether, paraffine, naphthalene, tar oils, sulphur, ozokerite, ceresin, and wood spirit. Sand, earth or ashes are the best extinguishing agents for these, but suitable appliances for proper application must be installed to make their use effective.

Water thrown on certain metals, when glowing, may be decomposed and cause explosions. Therefore in fighting foundry fires care must be exercised not to throw water into the cupola or pots.

If water is thrown on powdered substances they are scattered about, and spread rather than retard the progress of fire by scattering the powdered material in a cloud of dust; especially dusts of flour, lampblack, starch, soft coal and metallic powders.—William A. Richey, M.A.

WATER CURTAINS—See Open Sprinklers.

WATER GAS contains an equal volume of hydrogen and carbon monoxide. The process, in brief, is: Steam is passed through retorts filled with anthracite coal raised to a white heat by an air blast. In its passage it is decomposed and the gas coming from the pipes at the top consists of a mixture of hydrogen and carbon dioxide. This serves as the carrier for the true illuminating agents which are a comparatively small percentage of the entire volume, and these are combined by mingling with naphtha vapor. This mixture has now about the same composition as ordinary coal gas, but must be fixed—that is, made a staple compound by subjecting it to the effect of heat and cold. This is accomplished by conducting it through two series of pipes, surrounded in one case by cold running water and the other by steam. It is then purified in the same manner as mentioned. By passing it through a water-tower loosely filled with material such as charcoal, down through which water trickles as the gaseous vapor ascends, the ammonia is dissolved; then, passing it through thin layers of lime, the other main impurity, sulphureted hydrogen, is removed. It is then ready for distribution through the city. Inflammable.

WATER FLOW ALARM is the same as a Local Alarm.

WATER FRONT PROPERTIES—Are subject to high winds and although they are sometimes under fire boat pro-

tection, they are usually inaccessible. Gangs are liable to be in the neighborhood. Always inspect to see if proper watchman service is maintained. Quick burning risks. Accommodation business.

WATER HEATERS—Coal or gas is ordinarily used for fuel. The coils are located either above or at the sides of burners, the water being heated as it circulates through the pipes. They are less hazardous than stoves but for practical purposes the distance from combustible partitions should not be less than 18 inches. It should have a vent or smoke pipe entering a proper flue. See Heaters.

WATER JACKETS—See Jacketted.

WATER MAINS should be laid in complete circuit and be of sufficient size, not less than 6 inches, to provide volume under such head or pressure as will insure the delivery of full streams at each outlet in the service with a loss of head of not over 10 to 12 pounds below normal pressure. Exposed water pipes in dwellings can be prevented from freezing by covering them an inch thick with a paste made of boiled starch and sawdust, using a hemp twine or similar cord as a binder, and then coating with tar. See Water Systems; see Dead Ends.

WATER PIPES—See Leakage in Water Pipes.

WATER PRESSURE—A cubic foot of sea water weighs 64 pounds. Each cubic foot may be regarded as standing on a base of one square foot. Therefore, the pressure at the base of a cubic foot of sea water is 64 pounds per square foot. A cubic foot of water having a base of one square foot must be one foot high. The pressure at its base (64 pounds per square foot) is, therefore, the same as the pressure which would be encountered at one foot below sea level.

One hundred and forty-four square inches make one square foot. A vertical column of water having a sectional area of 1 square inch would therefore weigh 1-144 as much as a column equally high, but having a section area of one square foot. Since the pressure per square foot is 64 pounds, the pressure per square inch is 1-144 of 64 = 64-144 = 4.9 = 0.44 pound per square inch. At two feet below sea level, or double the depth, double the height and weight of water

stands on each square inch, therefore the pressure is double, or 2 × 0.44 = 0.88 per square inch. Each extra foot of depth adds an extra pressure of 0.44 pound per square inch. To find the pressure at any depth, multiply the depth in feet by 0.44 pound per square inch. (The Steamship.) See Pressure.

How to determine the number of gallons of water discharged at a fire—Let us assume that a gravity tank is elevated 20 feet above the roof and the height of the tank is 12 feet and the building is six stories high.

The fire takes place on the second floor. Example:

	Feet
Height of tank, full	12
Distance above roof	20
Height of sixth floor	12
Height of fifth floor	12
Height of fourth floor	11
Height of third floor	11
Height of second floor...(at sprinkler head)	2
	80
To get the pressure at second floor, multiply elevation by	.434 *
Which equals	34.720 lbs.

* See Pressure; also Water Pressure.

Say pressure is 35 pounds. With Grinnell type "A" head 21 gallons of water per minute would be discharged. (Always find out type of head, as amount of discharge differs. See Crosby-Fiske Forster Hand Book.) If 21 gallons of water per minute from each head, for two heads it would be 42 gallons, and if heads operated for ten minutes' duration there would be approximately 420 gallons of water discharged. See Water Puts Out Fire.

WATERPROOF GLUE is fish glue dissolved in hot milk.

WATERPROOFING CARDBOARD OR PASTEBOARD —*Paper* is treated in nitric acid solution, then piled in sheets *and placed* in hydraulic press.

WATERPROOFING CONCRETE BUILDINGS—This subject has received great attention from architects and builders owing to the natural tendency of concrete to absorb moisture. One method, and perhaps the oldest, is the tar and asphalt method of coating either with or without a paper or fabric binding or reinforcement. This method is useful in most cases but could not be used to advantage on the outside surface of a sea wall or under similar conditions. On the outside surface of a building, or on a floor where acids or alkali liquids are used, the **integral** method might be employed. In substance, this method is the introduction of a waterproofing compound into the cement or concrete which does not hasten or retard the setting of the concrete but which tends to close up all pores or voids and thus render the concrete work a solid moisture resisting body. There are other methods employed by builders, and many patented compounds are on the market; but all of them rely on the principle that there must be a continuous bond between the aggregates of the concrete of sufficient strength and durability to withstand the elements of time and weather.

WATERPROOFING PAPER—Paper is coated with a resinous soap, given bath of zinc chloride, pressed in rollers, washed, dried, coated with paraffine, then run through a calender. A poor class to insure. Accommodation business.

WATER PUTS OUT FIRE (HOW)—In order to understand this, we must first know what fire is and what keeps it burning.

Fire is a form of chemical combustion in which flames make their appearance. There may be combustion or burning without flame, although not without heat. When a body becomes heated from any cause and wastes away, turning into something else (as smoke or ashes), it is said to undergo combustion.

In the process of combustion or burning there must always be at least two things. First, there must be the combustible, and second, some supporter of combustion. When wood burns in the open air, the wood is the combustible and the air the supporter of combustion. The wood could not continue to burn if it were not surrounded by air. The air sup-

WAX POLISH may be composed of beeswax and turpentine.

WAX TAPERS are made by drawing several strands of twisted cotton thread through melted paraffine. Successive layers of paraffine are deposited on the thread by drawing it, several times, through one or more troughs of wax. The wax is heated in a kettle and poured by hand into the troughs. It is finally wound on a large reel, cut into lengths and packed. The floor becomes coated with wax, which is chopped off when it becomes a thick layer. Kettles should be steam heated. A poor class of insurance.

WAXED PAPER CUPS are very inflammable and should not be allowed to accumulate in piles or waste baskets after being used. A lighted match or cigarette thrown in such a pile may cause serious results.

WEATHER BOARDS—The boards nailed to vertical or inclined timbers at the sides of a building.

WEAVE—To unite, as threads of any kind, in such a manner as to form a texture; to entwine or interlace into a fabric.

WEB—The portion of an iron "I" beam just above the flange. This should be properly protected with tile or cement when used as a structural member.

WELD—To join two pieces of metal together by first softening them under the action of heat and then hammering them in contact with each other. See Oxy-acetylene Welding.

WELL HOLE—An opening larger than an ordinary light or ventilating shaft, piercing a series of floors for purposes of light and ventilation. They are considered poor construction features. Their large area makes all floors practically gallery floors, and fires quickly spread from floor to floor. See Shafts.

WHARF CLAUSE is attached to insurance policies when lines are to cover in storage, so that the assured is covered for ten days while the goods are on the wharf waiting assignment to a warehouse. See Piers.

WHEELWRIGHT—The hazards are those of small woodworkers and machine shops with painting. Tire pits should be built of brick with a heavy iron cover and have chimney

connection, if they must be located in a building. Open tire heating plates should be located safely away from buildings. They are used for heating the iron tire which is applied while hot, and shrinks on the rim when cool. Fair insurance risks if hazards are safeguarded.

WHISKEY flashes at about 90 deg. F. During Prohibition lines should be written cautiously, as the value in case of loss is a serious question.

WHITE GOODS—If wet, they must be salvaged at once before mildew appears.

WHITE LEAD is a compound consisting of carbonate of lead and hydrate of lead in chemical solution.

The Carter Process—Metallic lead is melted, and while molten is riven into fine particles, like flour, by a jet of high-pressure superheated steam. This amorphous powder, of a steel gray or dark blue color, is charged into a revolving cylinder 5 to 7 feet in diameter, by 8 x 12 feet long. One end of the cylinder is connected to an exhaust fan, and the other to a flue leading from a furnace where carbonic acid gas is generated from burning charcoal. Generally the products of combustion from a coke fire under a steam boiler of the plant are used for the corroding gas, the furnace gases having been washed and purified to free them from the sulphur present. The temperature of the revolving cylinder and the charge of powdered lead is kept at 140 deg. F. Diluted acetic acid and hot water are sprayed into the chamber at different times during the corroding process. The agitation is constant, as is also the heat. Balance of treatment, such as grinding, is the same as the Dutch process.

Dutch Process—In this process thin perforated sheets of lead are exposed in gall pots containing a weak solution of acetic acid (water 2½ parts of strong acid) or common cider vinegar. The pots are placed in long tiers, each tier being loosely covered with boards and stacked in large numbers. The bed of pots is then imbedded in tan bark, sawdust, stable litter, etc., that ferments and soon raises the temperature of the mass to 140 to 165 deg. F. A quantity of vinegar containing 50 lbs. of strong acid converts two tons of lead into *the carbonate of* lead in about 100 days. The only attention

the beds require during the process of corrosion is to control the temperature of the mass by regulating the admission of air to the interior of the bed by opening or closing the apertures left for that purpose. The corrosion is practically completed at the end of sixty days; but the lead is of light specific gravity, so it is the practice to allow the beds to remain 30 to 40 days longer, in which time the lead acquires a proper density. If the lead is allowed to remain in the bed too long, say 5 or 6 months, it is liable to become crystalline and transparent, and will be of poor covering power. Care is necessary in the use of stable litter to change the white carbonate of lead as it forms, into a dark sulphide of lead from the sulphurous hydrogen evolved during the process of decomposition of the manure. At the time of stacking, the air in the beds contains 20 parts oxygen; after two weeks it contains only 17 parts; in five or six weeks 7 to 15 parts, while the carbonic acid element will have increased from 5/8 to 23 or 27 per cent during the process of corrosion. (Note: I believe there is not enough oxygen and too much carbonic acid gas to support combustion. W. O. L.) From 30 to 40 per cent of the lead remains unchanged, which is separated from the carbonate by passing contents of the pots through a series of rolls, beaters and screens. The corroded lead is then mixed with water and ground to a powder in burr stones. Generally this part of the process is omitted (by the quick process lead manufacturers) because of the fine state of division necessary to reduce the metal lead, for these processes. The uncorroded particles are so intimately associated with the carbonate that they are indifferently eliminated in the separator and if run over the water stones, will cover the face of the stones with a coating of metallic lead that soon impairs the grinding power and gives a dark color to the product. After grinding, the mixed carbonate and water is mechanically floated to remove any coarse particles. It is then pumped to large settling tanks where it is double washed with pure soft water and bicarbonate of soda to remove any trace of acetic acid. When settled it is pumped to large copper drying pans and the water is evaporated. Drying requires 6 to 8 days, the tem-

perature of the dry rooms being 140 to 165 deg. F. It is then pulverized and marketed as dry white lead or ground in burr stones with linseed oil for a paste or paint. A modification of the Dutch process, known as pulp lead, consists of taking the pulp lead from the settling tanks and placing it in a tank of linseed oil and subjecting the moisture to a high speed mechanical stirring for a number of hours. Some of the water rises to the top and is drawn off but a great part is whipped into the emulsion or forced into combination with the lead. Pulp lead is inferior to other leads. All processes are detrimental to the health of the men owing to the gases evolved during the process.—"Rustless Coatings; Corrosion and Electrolysis of Iron and Steel." John Wiley & Sons, Inc., Publishers.

WHITE LEAD, IMITATION is made of lithopone, barytes, zinc oxide, linseed oil, fish oil, corn oil, tallow, water and whiting.

WHITE PHOSPHORUS—See Phosphorus.

WHITE ROSE OIL is a refined petroleum.

WHITE SPIRITS—See Turpentine substitute.

WHITE VITRIOL is also known as zinc sulphate and is soluble in water.

WHITEWASH is merely pure lime mixed with water and a little salt.

WHITING is made from chalk which is ground in a chaser, settled in vats, cooked in water, dried and ground. Dry room hazard. Fair insurance risks.

WHIZZERS are the same as centrifugal extractors.

WHOLESALE GROCERS—See Grocers.

WHOLESALE STOCKS—Underwriters generally carry larger lines than on retail stocks because the merchandise is usually in original containers such as cases, cans, boxes or crates on skids. The class of stock is important. Note if there is any commodity nearby which might contaminate other merchandise. If situated above the fifth floor write very cautiously unless risk is sprinklered.

WIND—That the direction of the prevailing wind should be a factor in the underwriting of a fire insurance risk on account of the exposures is a fact not apt to be taken in con-

sideration by the inexperienced. A building to windward of another, which is peculiarly liable to take fire, will be penalized less than one in the lee of the dangerous building.

Prevailing Wind record for 35 years shows N. Y. City to be on average W.—N. W. See Wind. See Waterfront property.

WIND MILLS—The old style types are subject to a serious fire hazard due to the ignition of the wooden shafts, by reason of over-heated gearing caused by racing in a heavy wind.

WIND PRESSURE—Architects figure that a fresh breeze blowing 10 miles an hour exerts a wind pressure of 0.49 pound per square foot; a stiff breeze at 20 miles an hour, 1.97 pounds; a strong wind blowing at 30 miles an hour, 4.43 pounds; a high wind blowing 40 miles an hour, 7.87 pounds; a storm blowing 50 miles an hour, 12.304 pounds; a violent storm blowing 60 miles an hour, 17.733 pounds; a hurricane blowing 70 miles, 24.153 pounds, and a violent hurricane blowing 100 miles an hour, 49.200 pounds. This accounts for the very heavy steel bracing found in the roof enclosures of high fireproof structures.

WINDOW DECORATIONS have caused numerous fires, especially where gas lights are used. Highly inflammable material, such as tissue paper streamers, cotton wadding wrapped around strings, should not be permitted in windows, where gas is used. A draft of air may blow the material into the gas flame. Such materials should never be wrapped around electric light globes. Celluloid articles can be set on fire by heat radiated from lamps and sun's rays.

WINDOW PROTECTION—In the Alwyn Court apartment house fire, March 4, 1910, the fire burst through the windows at the tenth floor and by means of thin glass windows at the court, gained access to floors above. Being out of reach of fire department hose streams, it was hard to combat. In fireproof buildings, the intense heat of burning material is projected through windows, and as smoke and flames curl upward from the top of the window it thus spreads to upper floors. Wired glass window protection is recommended. *See illustration, page 726.* See Wired Glass.

WINDOWS—The different parts are sill, horizontal muntins, vertical muntins, transom bars, stop stile, upper rail, jamb, head and walling-in flange.

WINDOW SASH WEIGHTS are made from old tin cans which are melted in rotary furnaces. This metal is then cast into window sash weights. Foundry hazard. An unattractive class.

WINDOW SHADE FACTORIES—Usually long frame buildings without lights, and heated by steam from boilers in detached structures. The sheets of cotton or muslin are fastened to large swinging wood frames. The first day, the cloth is sized with thin glue. The following day, it is coated with paint reduced about two-thirds with benzine. Usually a nuisance to the neighborhood. Fierce burning risks. A bad fire record class. (T. Hohlweck.)

WINE contains about 8 to 25 per cent of alcohol. No explosive vapors generated in manufacturing or handling. Manufacturing is not hazardous. See Distilleries.

WIRE is covered with cotton thread by drawing the wire over a roller revolving in a trough of glue. Then the thread is twisted on, dried by passing over steam plate, and wound on reels. An automatic machine.

WIRE FABRIC—Fine wire fabric of copper or brass is made into mesh by spinning, weaving and carding, similar to the process of making yarn. Other hazards are plating, annealing, tempering and light metal working. Good insurance risks.

WIRE LATH—A fabric or mesh of wires used in furring in place of wood lath.

WIRE SPIRAL COLUMNS—Consist of a continuous spiral of wire held upright and spaced equidistant by vertical reinforcing and spacing bars. They are used as concrete reinforcements.

WIRE TEMPERING—The wire is drawn through the flame of a coke furnace, then passes through a sand pit and is reeled up slowly for gradual cooling. It then passes through a lead bath and is reeled. The lead pot is coke-heated. This method is called lead tempering. Fair insurance risks.

WIRE WORKS—Hazards are drawing, spinning, annealing and tempering, metal working and machine shops. Considered good insurance risks.

WIRED GLASS—Its value lies in the fact that when broken, the pieces do not fall apart. Should not be less than one-fourth inch thick with wire fabric not larger than seven-eighths inch and wire not smaller than 24 B. and S. gauge. Plate glass is better than thin glass.

WIRED GLASS WINDOWS (efficiency of)—As a fire retardant wired glass has two defects: **First,** it will not stand as high a temperature as is known to occur in some fires and under some conditions; and **second,** it radiates heat to such an extent that combustible material at a distance of six feet may be ignited on the side away from the fire, even when the glass remains intact. Fusing point of glass is about 2200 deg. F. (H. A. Fiske.) See Window Protection. See illustration, page 726. See Shutters.

WIRELESS TELEGRAPHY outfits require extreme care in wiring and grounding.

WOAD—A plant used in blue dye manufacturing.

WOMEN'S NAMES—See Names. See Moral Hazard.

WOOD (spontaneous combustion of)—When wood is exposed to the long-continued action of heat, it undergoes progressive changes nearly akin to those which have taken place during the conversion of vegetation into coal. If the wood remains in contact with the heated surface for a considerable length of time, a temperature of a few degrees above the boiling point of water is enough to produce a semi-carbonized film. The wood will start smoldering at a very low temperature. The heat from an oil lamp or gas flame some distance away is sufficient to start the smoldering combustion. Even the temperature of a steam pipe has been found sufficient to cause ignition.—Frank R. Fairweather, in "Insurance Engineering." See Lumber.

WOOD (fireproofing of)—Lumber is run into large steam cylinders and vacuum is used to draw out the air; then it is run into a solution of ammonia salts or alum, and finally to the dry kiln. Usually large frame risks.

WOOD ALCOHOL—A clear, colorless liquid obtained

by dry distillation of wood. Also called Methyl Alcohol. Flash 32 to 60 deg. F. Boils at 149 deg. F. Classed as inflammable. See Alcohol.

WOOD CUTS—See Electrotyping.

WOOD DOORS TIN LINED—See Fire Doors.

WOOD-ENCLOSED STAIRS—See Stairs.

WOOD ENGRAVERS—Light woodworking hazard. Fair insurance risks.

WOOD FENCE HAZARD—Boys with bonfires occasionally ignite fences, which in turn set fire to nearby property.

WOOD FINISH AND TRIM IN FIREPROOF BUILDINGS—Ex-Chief Croker of New York, at the meeting of the International Municipal Congress, said: "If I had my way about it, I would not permit a piece of wood even the size of a lead pencil to be used in the construction of finish of any building in the United States exceeding a ground area of 25 by 50 feet, or three stories in height. If there was still an absolute necessity for its use, if we could find nothing to replace it, it would then be well to attempt to conceive of something better. I am opposed to the use of wood in any form in fireproof buildings, and the law ought not to permit its use. Wooden floors, wooden window frames, doors and casings burn, and trim and bases burn, everything that is made of wood burns and helps the fire to spread. Eliminate wood—remove the cause, and you have precluded the possibility of fires."

WOOD FIBRE—Called wood pulp. Shavings boiled in caustic soda, then chloride of lime.

WOOD FLOORS—In fireproof buildings should be laid without air space, i. e., "cement and cinder fill" should be laid around the sleepers to the underpart of the floor boards.

WOOD FLOUR—Wood reduced to fine powder. Not hazardous and will not ignite spontaneously.

WOOD GAS is obtained by the distillation of wood. Very inflammable.

WOOD HEEL MANUFACTURING—Processes consist of woodworking, nailing, trimming, sandpapering and covering with leather or celluloid. Glue heating should be ac-

cording to standard rules. Celluloid is worked in acetone. A poor fire record class.

WOOD NAPHTHA—See Wood Alcohol.

WOOD OIL—A drying oil similar to linseed oil, derived from the nut of the Chinese tree; sometimes called Tung Oil. It is likely to cause spontaneous combustion.

WOOD PRESERVATIVES—In preserving wood, the following materials are generally used. Coal-tar creosote, hardwood tar, wood creosote, copperized oil, sodium silicate, biproduct zinc sulphate, zinc chloride, zinc sulphate, cresol. calcium, sodium fluoride; heavy coal-tar oils, mixed with a small percentage of linseed oil, and a trace of turpentine. Some woods are chlorinated; i. e., treated with chlorine. Oil preparations increase the inflammability of the wood. Quick burning risks; serious exposure to surrounding buildings. Accommodation business. See Preservation of Timber.

WOOD PULLEYS IN ELEVATOR HEADS—See Pulleys. See Strut Boards.

WOOD PULP—Commonly called wood flour when in a finely divided state.

WOOD SPIRIT—Made by heating hardwood in an iron cylinder over a hot furnace. From this retort there is a pipe to a condensing chamber where the product is cooled by water playing over its surface. The distillate is a mixture of acetic acid, naphtha, tar and water. After a second distillation, the naphtha comes off at a lower temperature than the other ingredients. The insurance risk during manufacture is especially hazardous.

WOOD WOOL—See Excelsior.

WOODWORKING—See Cabinet Factories.

WOOL (green) is wool which has been shipped promptly after shearing, instead of lying in storage, as is usually the case. It is slightly heavier and contains more moisture than that which has been allowed to take the customary course through the warehouse. Spontaneous combustion is apt to occur in raw wool, especially if there is moisture in the mixture. The yolk of wool is a fatty material and contains among its constituents oleic acid, which absorbs oxygen. In a properly packed and stored bale of wool this action rarely

always takes place and is accompanied by a slight increase in weight and by the generation of a small amount of heat. This heat is nearly always concentrated near the centre of the bale, as it is here that the air has practically no access, and the non-conducting properties of the wool store up the heat. If the wool is moist, the increase of heat in the centre of the bale becomes excessive. Where large numbers of bales are stored in the hold of a ship it is well recognized that such moisture will cause damage to the wool, even though not resulting in a temperature approaching ignition.

WOOL FELT absorbs water very rapidly. It is susceptible to water damage. If wet, the "filling" swells and the felt becomes unsalable to the trade.

WOOL NOILS are the short fibres combed out of the long wool.

WOOL PULLERIES—The principal hazards are the dryers which should be of standard construction; dusters which should have blowers, and the sweat room. Lack of proper housekeeping is the cause of most fires in this class. Fair insurance risks.

WOOLEN CLIPPINGS, if clean and free from rags and sweepings, are considered fairly good insurance risks.

WOOLEN PREPARATION MILLS—Wool is "scoured" (washed) to remove dirt, natural oil and grease, in steam-heated vats with water and soap, and then dried. Dryers are usually heated by air blown from steam coils. The wool is placed on a continuous wire belting which travels through the dry room. Fair insurance risks. See Worsted Mills.

WOOLENS—If of good texture and of dark color, they are not readily damaged by fire and smoke. Clean water causes little damage if dried immediately. If in bolts (piece goods), considered good insurance.

WOOLLEYS SOLVENT—A cleaning fluid, classed with kerosene.

WORKMEN'S OVERALLS—See Lockers.

WORK TABLES—See Cutting Tables.

WORSTED MILLS—Raw stock is green wool. Processes in the main consist of wool sorting, wool scouring, *carding, combing,* drawing, spinning, weaving, wet finishing

and dry finishing. Fair insurance risks if hazards properly safeguarded.

WORT is extract from malt, hops and water.

WRITING INK—The ordinary fluid ink is a composition of tannic and gallic acids and iron (ferrosulphate), mixed with water and coloring matter. Small amounts of hydrochloric or sulphuric acid or denatured alcohol may be added. A cold process is used, except the coloring mixture is heated on a stove. Aniline, water and chrome colors are used. The basis of blue ink is Prussian blue. The basis of waterproof black ink is lampblack.

WROUGHT-IRON is not brittle like cast-iron, because there is only ¼ to ½ lb. of carbon in every 100 lbs. of wrought-iron. It seems to be composed of threads of fibres of the metal lying alongside of each other, so it is said to have a fibrous structure. It can be molded.

WROUGHT IRON AND STEEL when heated have a tendency to twist, due to the softening of the material and the consequent reduction of the resistance to tension and compression. They should be protected when used as structural members of a building. An unprotected steel or iron frame building will not resist fire as good as a building built of heavy wood members. See Cast Iron. See illustration, page 650.

X

XANTHIC ACID—A heavy colorless oily liquid consisting of bisulphuret of carbon, water and an oxide of ethyl.

XCIX—Special reducer, flashes at 180 deg. F. Classed as non-volatile.

XGLOGRAPHY—The act or art of cutting figures in wood, in representation of natural objects.

X-RAYS—A delicate, very susceptible piece of machinery used by physicians. The rays produced are able to penetrate many substances that are impermeable to light. The rays are produced with a glass vacuum tube and a battery, from which a current of electricity is sent through the tube. The wires of the battery are connected with two electrodes, one of which consists of a concave disc of aluminum, and the other of a flat disc of platinum. Inspection should be made where lines cover on physicians' furniture and fixtures, as the forms are generally broad enough to cover physicians' apparatus and instruments.

XVIII SPECIAL—A benzine substitute, flash 103 deg. F. Classed as non-volatile.

XYLENE or XYLOL—Compound of hydrogen and carbon. It is similar to dimethyl benzene. It is found in coal tar. Inflammable.

XYLITE—A specie of asbestos.

XYLODIN—Paper immersed for a moment in strong nitric acid and then washed in distilled water. The paper acquires the toughness of parchment and the combustibility of tinder.

XYLOGLODINE—An explosive compound.

XYLOGRAPH—An engraving on wood.

XYLOIDIN—An explosive compound produced by the action of nitric acid on starch.

XYLOL—An inflammable liquid, used as a solvent for *paint.*

XYLONITE is produced from tissue paper, treated with sulphuric acid and nitric acid, and converting the resulting nitrocellulose into a pulp, which is afterwards mixed with camphor and spirits of wine worked into a dough, then pressed into blocks, and cut into sheets. Very inflammable. See Celluloid.

XYROLENE—An imitation ivory; similar to celluloid. Very hazardous.

Y

YACCA WOOD—A native tree of Jamaica used in cabinet work.

YACHT BASINS—Generally consist of low frame shacks. In the winter frozen conditions are severe because boats cannot be moved. A poor fire record class. See Ship Building Yards.

YACHTS should be anchored out in the stream, except when the craft is laid up for repairs or for the season and not at the dock or club house, as in case of fire the loss may be large. Careful owners will not expose their pleasure boats to the hazard of a sweeping fire in a poorly kept boat yard or near buildings where a fire is likely to start.

YARN—Woolen or other thread spun and prepared for weaving.

YEAST is a living plant used for the purpose of causing fermentation. The yeast we use in baking is artificial, composed of a dough made of flour and starch and a little common yeast made into small cakes and dried. It is necessary to add water to start the fermentation.

YEAST FACTORIES—The process consists of receiving, elevating, cleaning, malting, grinding, conveying, mashing, cooking and fermenting the grain. The scum (yeast) from the tops of fermenting tanks is removed, mixed with water and starch, filtered and then pressed into cakes. The hazards are those of breweries. Fair risks if hazards safeguarded. See Vinegar Works.

YELLOW METAL—A kind of brass.

YELLOW PHOSPHORUS—See Phosphorus.

YELLOW WOOD—A hard wood of the dyers' mulberry tree. Used as a yellow dye in consequence of the large amount of tannic acid it contains.

YERBA—A tea from Paraguay.

YUCCA GRANCA—A wild grass of the Southwest, now being used in paper-making.

Z

ZACATON—A fibrous Mexican grass, used as a substitute for wood pulp.

Z BAR—An iron or steel rail, shaped at end or cross-section like the letter "Z," except that angles are 45 degrees.

ZAFFRE—An impure Cobalt oxide, prepared by roasting cobalt ore, reducing it to a powder, and adding three parts ground quartz or fine sand. It is used by enamelers, porcelain and glass decorators.

ZANTE is used as a yellow dye.

ZAPON LACQUER is used for varnishing metal. It is a solution of gun cotton. (Vapor is explosive if in contact with an open flame.)

ZAPUPE is a hard fibre.

ZEA FIBRE—Sometimes used in paper or cordage manufacturing.

ZERO—In Fahrenheit's scale, is 32 degrees below the freezing point of water. In Centigrade and Reaumur's scales, zero is the freezing point of water. To change from Centigrade to Fahrenheit multiply by 9, divide by 5 and add 32. To change from Reaumur to Fahrenheit multiply by 9 divide by 4 and add 32.

ZERO WEATHER—Always brings numerous claims for fires caused by overheating stoves or furnaces. See Coal Shortage.

ZINC—A bluish-white metal; is brittle when cold, but can be rolled into sheets when heated to a certain degree. Explosions in chemical risks are known to have been caused where zinc is dissolved in hydrochloric acid. It melts at 786 deg. F.

***ZINC* (resinate of)** is not permitted in listed storage stores *on account* of the fine state of division of the resin in the

compound. It may be expected to heat and ignite spontaneously, if moist; similar to zinc dust.

ZINC CHLORIDE—The salt obtained by heating zinc in chlorine gas, also by dissolving zinc in hydrochloric acid. Hydrogen is given off in the process. The process is dangerous. A powerful dehydrant. No fire hazard.

ZINC DROSS—A material skimmed from zinc; a by-product of galvanizing iron.

ZINC DUST—Consists chiefly of finely-divided metallic zinc. It is subject to spontaneous combustion when moist. Classed as inflammable, and is not permitted in stipulated stores.

ZINC ETCHING, up to a certain point, is quite similar to half-tone work, and is usually employed to reproduce pen sketches or designs which are photographed, as in the half-tone process. In printing on the zinc plates from the negatives, however, no screen is used as in making half-tones. After the sensitized plate has been printed from the negative it is "rolled up" or inked. The ink is then removed from all parts of the plate except those affected by the light. On these parts it remains and then the plate is rubbed with dragon's blood, which adheres to the ink portions only. The application of dragon's blood is frequently necessary to protect the parts of the plate which are not to be etched. After a sufficient number of etchings, or "bites" (as they are called) the plate is passed to the router. Fair insurance risks.

ZINC ETHYL ignites in the air at ordinary temperature; reacts with water giving rise to hydroxide of zinc.

ZINC FLUE DUST is somewhat similar to zinc dust.

ZINCITE—A mineral zinc oxide.

ZINC METHYL—Same properties as zinc ethyl. Is very volatile and takes fire in contact with air.

ZINCODE—Negative pole of a voltaic battery.

ZINCOGRAPH—An impression from a zinc plate.

ZINC OXIDES—Prepared by burning zinc in atmosphere air or by heating the carbonate to redness. To prepare zinc on a large scale, metallic zinc is volatilized in large earthen mufflers whence the zinc vapor passes into a small *receiver where it* comes in contact with a current of air and

is oxidized. The zinc oxide thus formed passes immediately into a condensing chamber, divided into compartments with cloths. It is then filtered, pressed, dried, ground and pulverized. Attrition, burr, and ball mills are used for grinding. Considerable dust is generated in the process.

ZINC PIGS OR SLABS is considered excellent insurance.

ZINC SMELTERS—Hazards similar to foundries. Furnaces resemble those used in glass works. The heat at the stack is excessive, more so than other kinds of smelting. Fair insurance risks.

ZINC SULPHATE—See White Vitriol.

ZINKENITE—A mineral containing sulphur, lead, antimony and copper.

ZUMIC ACID—An acid discovered in vegetable substances which have fermented.

ZYLONITE—A substitute for ivory, made by treatment of cellulose or vegetable fibre with sulphuric and nitric acids, producing a pulp which is dissolved in camphor, and drying the same. It presents the same hazard as pyroxilin or celluloid.

ZYMONE—The residue of the gluten of wheat after it has been treated with alcohol.

ZIRCON—A heavy hard sparkling mineral, transparent varieties of which are cut into gems.

ZIRCONIUM—A rare, very hard metallic element obtained by reducing the silicate with carbon in an electric furnace. It is mixed with Thoria and other rare earths, and is used in the treatment of incandescent mantles and for electric furnace linings.

ZIRKONALBA NO. 1 (trade name) is practically chemically pure and contains only traces of iron, titania and silica. This grade is intended especially for the manufacture of super-refractories. It has a melting point between 2800 deg. and 3000 deg. C. (5072 deg and 5432 deg F.). Zirkonalba is now being used as a lining for electric furnaces and in the manufacture of articles which are subject to very high and rapid fluctuations of temperature, and the corrosive action of slags and furnace gases. Another important use is as a

turbidity producing agent in acid-proof enamels and glazes for cast-iron or steel vessels. Its resistance to chemical action makes it much superior to stannic oxide which heretofore has been the only reliable opacifier for enamel work. When combined with boric acid compounds, such as borax, it forms a zirconium borate, which is a very powerful opacifying body for glass.

ZIRKONALBA NO. 2 (Hydroxide) has nearly all the desirable properties of the purer product, except that its melting point is not as high, due to the pressure of about 9 per cent of silica.

Fire is a Good Servant, but a Hard Master

Finis.